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Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services

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Also available under the title

Eurostat OECD. Methodological Guide for Developing Producer Price Indices for Services, European Commission

ISBN 92-79-01869-8, Cat. Number: KS-8E-06-003-EN-N, ISSN 1725-0048

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Foreword

The *International Producer Price Index Manual* (PPI Manual) published by the IMF in 2004, constituted a landmark for international standards on price measurement and contains detailed, comprehensive information for the compilation of producer price indices as well as an extensive coverage of the conceptual and theoretical issues. This *Methodological Guide for Developing Producer Price Indices for Services* is a complement to the PPI Manual in two ways: it focuses on service-specific aspects in the PPI compilation by developing further the conceptual framework and it adds detailed descriptions of PPI measurement for a series of service industries.

This *Guide* has been jointly produced by the OECD, Eurostat and the members of a Taskforce with delegates from 19 OECD/EU Member countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Japan, Korea, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. Several countries contributed to the guide by providing descriptions of service PPIs for individual industries, other countries were represented by national experts in at least one meeting of the Task Force.

The general chapters in the *Guide* were written by members of the OECD and Eurostat Secretariats and under the guidance of the Task Force. On the side of the OECD, Seppo Varjonen has been the principal author and on the side of Eurostat, Isabelle Rémond-Tiedrez. Richard McKenzie (OECD) also contributed significantly as an author and as co-editor. Several individuals from countries made important contributions to the advancement of the report, in particular Kuniko Moriya (Bank of Japan), Aurél Kenessey de Kenese (CBS Netherlands), Jari Harjunpää (Statistics Finland) and Benoît Buisson (INSEE France).

The electronic version of the Guide is made available on both the OECD and Eurostat websites. The Taskforce views the Guide as a 'living document' that it will amend and update to incorporate additional service industries and to address particular points in greater detail. An editorial committee will be established for this purpose. It is hoped that this *Guide* will advance the development of services producer price indices in the OECD region and beyond with a view to provide better information for decision-making and analysis. The report is published jointly by OECD and Eurostat.

Eurostat
Inna Steinbuka

OECD
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Introduction

In OECD countries, services account for the main part of GDP. Yet, statistical systems are still disproportionately centred on goods and goods production. This is in particular true for producer price indices where price indices for goods by far outnumber available price indices for services. There are several reasons for the asymmetric coverage of price indices. One is simply that goods historically used to play a more important role than services and this has shaped statistical systems. Another important reason is that developing service price indices is a difficult and expensive task. Service output is often hard to identify even on purely theoretical grounds, and even more difficult to measure reliably. For example, services may be unique and have to be treated like new products (e.g. various consultancy services) or they can be tailored or bundled in different ways for different users. All this implies complexity and high costs for price measurement.

Services producer price indices (SPPI) are intended to trace price movements that reflect the supply and demand conditions in the service markets, with a view to facilitating the analysis of macro economic conditions and in monitoring inflationary pressures. They also have an important role to play as a deflator to convert the value of service output into volume measures[1]. Volume measures of service output of various periodicities are essential for economic analysis. Services producer price indices are also useful for the business community to evaluate particular markets.

The aim of this guide is to aid countries to develop producer price indices for 'business services', i.e., those services that are mainly aimed at uses other than household consumption. Services predominantly for household consumption are expected to be covered by the consumer price index (CPI) and are outside the scope of this guide.

The guide is intended to complement the PPI Manual,[2] which discusses index theory and provides general guidelines to be applied in different steps in the compilation of price indices but does not include extensive discussion of producer price indices for particular industries or products[3]. In addition, many business services differ from "typical" products and require individual discussion. Also, the methods used to achieve constant quality pricing are often complex and dependent on the particular service industry and product. It was for all these reasons that a separate guide to measuring services producer price indices has been developed.

The present guide has been prepared by a joint OECD-Eurostat Task Force established in 2002. The Task Force's basic objective has been to enhance the development of services producer price indices and, in particular, to provide input to a common methodology on service prices. The development of methodology *as such* has not been an aim of the Task Force. The intention was rather to rely on material already produced by the Voorburg Group on Service Statistics[4] and within the international PPI Manual. The Task Force started by selecting those service industries where the development of price indices was considered most urgent. Selection criteria were the size of industries and the speed of technical change that is likely to affect price measurement. Inevitably, this guide has to devote some space to concepts and methodology but its main purpose is to propose practical solutions for the development of SPPI for countries where such development is still at an initial stage.

The general part of the guide is intended to apply also to those 'business' services that are not explicitly covered in the chapter on individual

[1] Producer price indices are the preferred measure for deflation in Eurostat's Handbook of Price and Volume Measures in National Accounts. In some market sectors (e.g. banking, insurance) and most non-market services (e.g. education) the calculation of producer price indices is particularly problematic due to the lack of observable prices. Calculations of volumes therefore often have to rely on second best methods which are described in the handbook.

[2] Producer Price Index Manual: Theory and Practice. Website http://www.imf.org/external/np/sta/tegppi/index.htm

[3] Some examples on the compilation of SPPI can be found in Chapter 10 of the PPI Manual.

[4] The Voorburg Group has been the leading international forum for establishing an internationally recognised methodology for developing producer price indices for service industries since the late 1990's.

industries. However, it is possible that when the scope of service industries is enlarged some modifications to the text are necessary. A case in point may be financial services which, in spite of their importance, were excluded from the guide at this stage. The main reason for the exclusion was that the definition of output in these industries is presently under discussion in the ongoing SNA/ESA revision.

The guide is based on the premise that services of a particular industry are relatively similar in different countries and, therefore, practices adopted in one country may be applicable in others. Consequently, the guide draws heavily on the experience of countries already producing SPPI. It tries to identify best practices across a wide range of countries. Ideally, this information will lead to similar approaches being taken in SPPI compilation across countries and increase the comparability of the resulting price series. When such SPPI are used for deflation in the national accounts, this should also result in greater comparability of volume changes of services production.

Chapter 1 of this guide discusses general aspects in the compilation of SPPI such as their scope, price concept, timing of prices used in an index and the collection of prices and weights. Chapter 2 discusses the main pricing methods underlying SPPI. Chapter 3 addresses practical aspects to be taken into account in the price collection. The focus in these chapters is on issues that are typical for services. Index theory or general aspects of index compilation are not discussed at all or only at the margin and the reader is referred to the international PPI Manual.

Chapter 4 is based on country practice and reports on feasible solutions for a set of service industries. The presentations explain the contents of services and classification issues relevant to the industry in question and then discuss methodological aspects in the compilation of SPPI for the services concerned. The list of service industries covered in Chapter 4 and the structure of the presentations are shown in section 4.1.

1. General aspects of SPPI compilation

1.1 Definition and scope of SPPI

1.1.1 Coverage of SPPI

An SPPI is defined here as an output price index for the service production of resident producers. Further, the index relates to the production of those services that may constitute the principal or secondary activity of an industry. The index covers services provided for all uses, intermediate and final consumption, and for exports. However, the use in intermediate consumption dominates because this guide restricts itself to discussing only those service industries that are mainly aimed at business use.

Imported services, i.e., services provided by units that have residence in some other country, are not within the scope of SPPI as defined for the guide at hand.

Whether or not service production belongs within the scope of SPPI depends on the residency of the service provider. While the separation of resident and foreign producers (and consumers) sounds straightforward, it is not always easy to define. The SNA/ESA provides general principles for the recording of a unit by referring to its "centre of economic interest". This is explained in the SNA (par. 14.13) as follows:

> In most cases, it is reasonable to assume that an institutional unit has a centre of economic interest in a country if it has already engaged in economic activities and transactions on a significant scale in the country for one year or more, or it intends to do so. The conduct of economic activities and transactions over a period of one year normally implies a centre of interest, but the choice of any specific period of time is somewhat arbitrary and it must be emphasised that one year is suggested only as a guideline and not as an inflexible rule.

The Balance of Payment Manual is fully in line with the SNA/ESA but provides more guidance. Paragraph 78 explains that a unit located abroad is recorded in production of a host country (and is thus **outside** the scope of SPPI) if the following conditions are met:

> ...In addition, the enterprise must, among other considerations, maintain a complete and separate set of accounts of local activities (i.e., income statement, balance sheet, transactions with the parent enterprise), pay income taxes to the host country, have a substantive physical presence, receive funds for enterprise work for the enterprise account, etc. If these conditions are not present, the activity should be classified as an export of services by a resident enterprise.....

These guidelines remain difficult to interpret in certain practical situations. For example, a borderline case exists when there are subsidiaries or separate units that an enterprise has established abroad to be closer to customers. These units might provide services for the host country and possibly also for the parent enterprise. On the other hand, a domestic enterprise may provide services to these units, in which case the question arises of whether these services should be recorded in domestic use or in exports.

The question of residence of production units is encountered also in other statistics, particularly in national accounts, which are aimed at covering exhaustively all economic activities in a country, and in balance of payments statistics. Close co-ordination in the compilation of statistics is important to ensure that the treatment of borderline cases of residence is consistent across different statistics.

The coverage of *all* output means that SPPI comprise prices in the provision of services to all institutional sectors, financial and non-financial corporations, government units, non-profit institutions (NPISH), households and the rest of the world. However, services provided for different markets are not necessarily the same, and their price development can be different. Sub-division of an SPPI by destination of output can therefore be desirable and would enhance its use, particularly for purposes of deflation in national accounts.

It is noteworthy that the scope of SPPI as defined by the Task Force is wider than the provision of goods and services from business to business. The scope chosen by the Task Force constitutes a more general approach consistent with the International PPI Manual and national accounts.

1.1.2 Goals of SPPI

There are two main goals of SPPI. One goal is to provide a short-term indicator of the business

cycle. For this goal, the SPPI has to reflect changes in prices as fast as possible. The other main goal is to provide a suitable deflator for value developments, mainly for national accounts. For this second goal, the SPPI should represent all output as defined in national accounts and follow, as closely as possible, the accrual principle in recording prices.[5] There is normally no conflict between these goals and if any they can often be reconciled in the SPPI development. However, in exceptional cases, it is important to explicitly assess how well an SPPI is fit for the goals mentioned above. Two examples illustrate this issue.

1. In air transport, a quick indicator of price change can be based on price quotes for tickets that are bought long before the travel date. For instance, if prices of summer vacation airfares are largely known by April, this information could enter a business cycle index before the summer. But for deflation of production, these prices have to be reflected in the SPPI concerning the summer months, which are typically only available after the summer;
2. An extreme case is provided by operational car lease. Prices stay fixed for several years. The correct deflator reflects all production, which is mainly composed of the old lease contracts that are still running and a relatively small weight is given to prices that are new in the last survey period. However, as a short-term indicator for business cycle analysis, the development of the price level at which new contracts are concluded would be more pertinent.[6]

In this guide, preference is given to the use of SPPI as deflators in the national accounts. This choice is in line with the PPI Manual which also recommends that the accrual accounting rules are as far as possible followed in the compilation of PPIs. Accordingly, an SPPI should reflect market situations at the time of service provision. Because the same accrual principle is applied in recording current output in the national accounts, use of a SPPI for deflation of output results in a meaningful output volume.

1.2 Statistical units

1.2.1 General principles

The PPI Manual recommends that the scope of PPIs should be defined by the principles that apply to the definition of output in the national accounts. There, output measures are based on the production of establishments or local kind of activity units (LKAUs) as they are called in the ESA. Establishments/LKAUs are defined as production units that have a single location and whose production is homogeneous (subject to the limitations of obtaining production account data). Thus, enterprises might be partitioned into smaller and more homogeneous units if they are engaged in different kinds of activities or are situated in different locations, and services provided by these units should be registered separately. Weights and sampling for an index should in principle be established accordingly.

In practice, the use of establishments/LKAUs as the basis for weighting and sampling is not always possible because information is limited. Particularly in the case of services, information on turnover by enterprise is typically used as a basis for index compilation. There are also large differences among service industries in this respect. This is shown in Chapter 4 where data sources and compilation practices are described as they are currently applied in various countries and various service industries.

1.2.2 Output of statistical units in special cases

A consequence of the definition of output is also that, for consistency, **sub-contracts** of services should be treated in an index in the same way as any other services, without taking into account whether a service to be priced contain sub-contracts or whether a service itself is a sub-contract. This is self-evident if the contractor and sub-contractor belong to different categories in the product or activity classification as producers can use any goods and services as intermediate consumption when providing services. In

[5] In accrual recording, service output in national accounts and associated prices are recorded at the date when services are provided. Accrual principle is discussed in section 1.6.

[6] Note that in the Netherlands two separate indices with respective goals are published for operational car lease See the Voorburg Group website, conference 2004: paper

addition, in principle this also concerns cases where the contractor and sub-contractor belong to the same category in a classification. SPPI are not aimed at measuring price development for net output of services.

However, in practice the situation is not straightforward and sometimes it might be appropriate that a SPPI does not cover the total output of an industry. Three types on contracts can be identified: "pure" main contracts with no sub-contracting, main contracts that include sub-contracts, and sub-contracts themselves. Evidently, the first group of contracts belong to the scope of SPPI but for the other two exceptions can be considered:

1. In national accounts, separate indices for all contracts and sub-contracts are in principle needed for deflation purposes, but only one kind of index is normally produced. In this situation, an index that is made up **only of main contracts** (that may or may not include sub-contracts) might be seen as preferable. The reasoning is that the use of such an index as deflator gives the best estimate for value added which is the main interest in the national accounts rather than output, and inclusion of sub-contracts is not necessary to achieve this aim.[7] Secondly, an SPPI based solely on main contracts is an appropriate deflator for the use of services in other industries and sectors because those services are by definition made up only of main contracts;
2. Another consideration is to include **pure main contracts and sub-contracts** in SPPI and exclude main contracts that contain sub-contracting. A case in point is the situation where observed prices are time-based (e.g. hourly rates) rather than prices of clearly specified services. In this situation it is important to ensure that there is a consistency between prices and labour input. To achieve this, prices of contracts that include sub-contracts are not eligible to be used as such in a SPPI. (See discussion of time-based pricing methods in section 2.9.2).

Output covers also services that an establishment/LKAU provides to other units of the same enterprise.[8] The SNA recommends that these **intra-enterprise services** should be valued at current basic values and avoid using artificial transfer prices in their valuation[9]. However, in practice these services are often valued at nominal values in the enterprise's bookkeeping rather than at current basic prices. For unique products reference prices cannot even found in the market. The PPI Manual notes that one of the primary goals of the PPI is to help determine the magnitude and direction of price movement on both a macro- and microeconomic level and for such a use, any index containing non-market prices not paralleling market price movement is of dubious value.[10] Therefore it is best to avoid these types of services in compiling the SPPI.

There are also borderline cases such as the provision of services by **temporary employment** agencies. The ESA (paragraph 11.13) recommends that persons employed by temporary employment agencies are to be included in the industry of the agency which employs them, and not in the industry of the enterprise for which they actually work. As a consequence of this recommendation, the value of services produced by the agencies amounts to all payments (including compensation of temporary employees) and not only "net fees" received by the agency. On the other hand, the ESA notes in the same paragraph that the treatment on a net basis might be more suitable for purposes of input-output analysis – that is temporary workers are to be

---

[7] Value added is conceptually output minus intermediate consumption. Thus, if SPPIs for sub-contracts are included both in output and intermediate consumption, the effect on value added offsets. Note also that the results are, of course, the same in all alternatives if prices of main and sub-contracts develop in parallel.

[8] See SNA, par. 6.87/ ESA, par 3.14 Note also that intra-enterprise services should not be mixed up with production of services for own consumption by an establishment (e.g. transportation, storage and maintenance services). These are produced by so-called ancillary units and are not separately identified or recorded either under the output or the intermediate consumption of the establishment/LKAU or the enterprise to which it belongs. Services provided by ancillary units are outside the scope of SPPIs.

[9] See SNA, par. 6.82

[10] See PPI Manual, par. 3.35. Discussion on the treatment of transfer prices in exports and imports can be found in Chapter 18 of the forthcoming Export and Import Price Index Manual. (See manual)

reclassified in this case into the enterprise where they actually work and only net fees are recorded as value of services purchased from the agency. Any decision about the gross or net treatment of prices underlying SPPI should be made in line with national accounts practice and may thus vary between countries.[11]

There are also some other service activities where establishing an index on a gross or net basis should be considered. Such an activity is for example advertising services where strict rules are difficult to set because provision of those services might be organised very differently.[12] The SNA/ESA makes very clear that production of different establishments/LKAUs is not allowed to be consolidated in the national accounts but no detailed guidelines are available to specify in which case production of individual statistical units is recorded on a gross or net basis. Thus, an assumption can be made that recording in national accounts follow directly bookkeeping practices. SPPI should be in accordance with the institutional organisation of service production which might be different in different countries.

1.3 Product and industry SPPI

The PPI Manual introduces three options for the classification basis of PPIs. They can be based on industries, products or both. In industry PPIs, the compilation of an index is based on all output of units classified to the industry concerned and the resulting index thus covers principal products of that industry as well as secondary ones that are principal for some other industry. Product PPIs are compiled solely on the basis of products, without paying attention to which industry the producer unit belongs. The choice of the basis for developing PPIs depends on the priorities of individual countries.

This guide assumes that the main use of SPPI is deflation in national accounts, and therefore suggests that SPPI be product-based rather than industry-based. Following recommendations of the SNA/ESA, the GDP compilation in countries is increasingly based on the framework of supply and use tables, which means that data on output of industries are available by product groups and are not shown only as a sum of various types of products. In this situation, it is preferable to deflate output by product groups and to separate primary from secondary production rather than use a single deflator for the total output of an industry. In other words, by using product-based PPIs national accountants may themselves estimate price and volume development for industry outputs where changes in the composition of output are taken frequently into account.[13] Having product SPPI available for deflation purposes is more practical rather than using an industry-based price index, which would require frequent re-weighting to match with the industry output in national accounts.

CPIs and other price indices are also based on grouping by products. This provides greater scope for combining various price index data at an aggregate level for use in balancing supply and use in national accounts, and in macroeconomic analysis.

In practice, the primary goal of developing product SPPI is often not systematically adopted because availability of output data by product varies industry by industry. Thus, SPPI in a country may be a mixture of industry and product SPPIs depending what kinds of data sources are available for various industries. In general, product-based statistics on outputs are less developed for service industries than goods industries, which limits possibilities to establish a sample frame and weights, and to update an index.

At the same time, the choice between industry and product SPPI may be less important in the case of services than in the case of goods, because the share of secondary production tends to be smaller in the former. Exceptions exist though with significant secondary production in industries such as management consultancy.

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[11] No problems arise, of course, if the temporary worker is not on the payroll of the employment agency. Discussion of when a person is interpreted as an employee can be found in the SNA par. 7.23-7.30 and in the ESA par. 11.13.

[12] See discussion of advertising services in section 4.17.

[13] Note that it is sounder to assume that prices of outputs follow prices of similar products wherever produced (as principal or secondary production) rather than prices of other outputs in the producing industry.

Most countries establish individual SPPI at the 4-digit industry level. Price movements for products primary to the industry are surveyed within businesses and aggregated to form these 4 digit industry level indexes. This is discussed further in section 3.7.2 "Weights and aggregation of an index".

1.4 Price concept

The PPI Manual recommends that PPIs should measure actual transaction prices reflecting the revenue received by the producer for products actually sold to customers. They should take into account any applicable discounts, rebates, surcharges, etc. that may apply to the customers. Because the price reflects revenue received by the producer, taxes on products should be excluded from prices whereas subsidies on products received by the producer, if there are any, should be added. In other words, the recommendation is to apply a concept of basic prices to the measurement of SPPI. This is also recommended by the SNA/ESA for the valuation of output in the national accounts.

Valuation and scope of the index are closely linked and cannot be chosen independently of each other. Valuation of output at basic values is preferred because taxes or subsidies might depend on users, and it would be an undesirable characteristic for an output price index to vary simply because the composition of purchasers changes, all other things being equal. However, it should be noted that product-based taxes and subsidies play a relatively smaller role for services than for goods[14].

1.5 Identification of service products

1.5.1 General guidelines

The identification of service products is a fundamental task in SPPI compilation. It involves identifying those service characteristics that are price-relevant and distinguishing between apparently similar services. This task tends to be more complex for services than for goods, and – among services – more complex for those that are mainly sold to enterprises than for pure household services.

Factors to be taken into account in the determination of products are discussed at a general level in the SNA/ESA.[15] These guidelines are valid for both goods and services and help to identify different products at a given point in time; they also give guidance for the index treatment of goods and services, whose characteristics change over time. The principles are laid out in par. 16.110 of the SNA as follows:[16]

> In general, therefore, it is necessary to pay attention to differences in the situation, or conditions, in which goods and services are supplied, as prima facie these may all be expected to introduce qualitative differences into the goods or services supplied. In economic theory it is generally assumed that whenever a difference in price is found between two goods and services which appear to be physically identical there must be some other factor, such as location, timing, conditions of sale, etc., which is introducing a difference in quality. Otherwise, it can be argued that the difference could not persist, as rational purchasers would always buy lower priced items and no sales would take place at higher prices. In most cases, therefore, differences in prices at the same moment of time must be taken as prima facie evidence that the goods or services concerned represent different qualities of the same general kind of good or service..... this implies that if there is a switch towards higher priced - i.e., higher quality - goods or services, this will be recorded as an increase in volume and not price.

The SNA suggests that price differences between similar service products imply quality differences between these products, but only on the condition that "full" information is available.

For services provided to enterprises, the condition of full information is often not met because services are typically based on unique contracts between service providers and clients. As a result, prices paid by different clients might vary

[14] One area where the impact is likely to be greater is transportation services where taxes as well as subsidies often exist.

[15] Discussion can be found in Chapter 16 of the SNA and in Chapter 10 of the ESA.

[16] The PPI Manual, Chapter 8 (section D.3.1.2) discusses evolutionary and revolutionary products that differ in terms of size of changes in products. Evolutionary products can be replaced in an index without changing the weight structure whereas revolutionary products are additions to the index and require changes in weights.

significantly but this information is not freely available. More guidance should be found for this kind of situation. The ESA summarises the general rules to be applied in cases where apparently similar products are transacted at different prices as follows.[17]

> The existence of observed unit value differences is not to be considered as an indicator of differences in quality when the following circumstances apply, namely lack of information, price discrimination reflecting limitations in freedom of choice and the existence of parallel markets. In these cases, the unit value differences are considered as differences in price.

The quotation suggests that in most cases differences in prices should, at least in principle, be interpreted as price differences rather than quality differences. Specifically, the provision of services to different markets or clients does not constitute a case of different qualities of service products.

Implementing the recommendation is still not easy particularly because price discrimination is difficult to prove. Data are often not available to distinguish price discrimination from situations where service products can be regarded as intrinsically different. This is acknowledged also in the SNA, which recommends in paragraph 16.117 that "If there is doubt as to whether the price differences constitute price discrimination, it seems preferable to assume that they reflect quality differences…".[18]

Notice also that the SNA/ESA rules identify **location** as a product determining factor. Conceptually, therefore, prices of "same" services provided by an enterprise in two locations should not be averaged but treated as different services. This requirement is met if establishments/LKAUs are used as elementary units in an SPPI. How closely this requirement can be followed, will depend on the type of service and specific conditions in a country.

[17] See ESA par. 10.19

[18] See also discussion on price discrimination in the PPI Manual (par. 6.92-98). The discussion refers only to goods but its recommendation to investigate reasons for price differences is equally valid for service products.

1.5.2 Duration of service-provision as a service-determining factor

A major difference between goods and services is that the delivery of services often coincides with their production. This is not normally the case for goods that may be routed via inventories and thus the link between production and sale is less direct. Consequently, the **duration** of production is of direct importance for the purchaser of services and may constitute an important price determining factor. It concerns many services such as passenger transport, where the preference of faster transportation over slower transportation means that the duration of the production of transport services impacts on their price.

There are other services where production and consumption do not necessarily coincide (e.g. accounting services) and where duration has less importance as a price-determining characteristic. For these services it is normally sufficient to ensure that the resulting service is well specified. In general, services where clients are direct objects of services tend to belong more often to those cases where addressing duration is important.[19] These are largely consumer services rather than business services. For most business services, longer or shorter duration of production is an expression of lower or higher productivity[20] but is not relevant for the quality of the service product. There is no need to take it into account as long as duration is not explicitly referred in the service specification.

Addressing the question of duration is particularly relevant when prices used in an index do not concern total service received by a client but are expressed in terms of working time, such as charge-out rates. There, the duration of service production is potentially important and the inability to measure it can result in bias in an

[19] Still, not all individual services belong to this category. For example, duration of many personal services may vary but they can be treated as the same services when clients are not willing to pay a higher price for a more rapidly delivered service.

[20] Productivity is understood here as labour productivity, i.e., a change in the working time needed to provide the same service product in two periods. A rise in labour productivity may be a result of increased intensity of service provision during one hour worked or of increased quantity of capital used per hour worked.

SPPI. Put differently, no consumer will be willing to pay a higher price just because the productivity of producing such a service has fallen. These issues are discussed more closely in Chapter 2.

1.6 Timing of price collection

1.6.1 Accrual principle

As explained in section 1.1.2, when SPPI are used for deflation in the national accounts, where the accrual principle is followed in recording output, the same principle should also be followed in compiling SPPI. Otherwise, deflation would result in biased volume measures of output. When SPPI are designed to monitor short-term price movements in their own right, other recording principles may apply. In particular, prices may in this case be directly based on prices recorded at the point in time when service agreements are concluded rather than when services are actually provided.

Accrual accounting is defined in the SNA par. 3.94 as follows:[21]

> "Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished. This means that flows which imply a change of ownership are entered when ownership passes, services are recorded when provided, output at the time products are created and intermediate consumption when materials and supplies are being used."

What accrual recording means in the case of services, is explained in the SNA par. 3.98:

> "Services are recorded in the System when they are provided. Some services are special in the sense that they are characteristically supplied on a continuous basis. Examples are operating leasing, insurance and housing services (including those of owner-occupied dwellings). These services are recorded as provided continuously over the whole period the contract lasts or the dwelling is available."

There are no major problems in implementing the accrual principle in price indices, providing the provision of services coincides closely with the time when the contract is signed or the payment made. However, particularly for services provided to enterprises there can be differences between the time when services are provided and when they are payable.

A case in point is transportation services, air transport particularly, where non-refundable tickets are bought at lower prices even months in advance. Evidently, services that have to be paid in different points of time belong to different quality categories and have to be treated as different services. However, the question remains how to implement the accrual principle in these cases. In other words, it is obvious that services should be dated to the time of service production but at which prices?

The SNA/ESA recommendations for recording output in these cases seem to suggest that prepayments should be recorded as "interest free loans" (rather than as purchases of tickets) from clients to service providers that are paid back at the time of service provision. The client "buys" the ticket once again at the time of service provision, which ensures consistency between supply and demand of services.[22] This means that prices used for SPPI should be based on face values and recorded at the time of service provision.

Another problematic case for application of the accrual principle arises when there are long-term contracts with up-front payments rather than payments on an ongoing basis. Services are provided continuously and, accordingly, prices should be allocated to the whole period but, because of the up-front payment and the long-term contract, there is no immediate possibility to say whether the price for the delivery of the service is the same throughout the period or whether it varies. All that is known is the average price over the entire period. However, prices of contracts should reflect supply and demand conditions at the time when services are actually provided.

There is no simple solution to this situation. One possibility to be considered is to emulate prices over the contract period on the basis of cost

[21] In the ESA, discussion on recording on an accrual basis can be found in par. 1.57.

[22] The valuation principle is not fully satisfactory because prices at two different points of time can not be held the same. Neither the present SNA/ESA explicitly discusses this issue. Guidelines for implementing accrual principle are intended to be elaborated in the ongoing SNA revision programme. Consequently, recommendations in this guide need to be reviewed after the new guidelines become available.

development. Such a procedure is typically applied in the estimation of price development for the shipbuilding industry.[23] While this method might be reasonable in individual contracts it does not capture the evolution of market conditions (or captures only supply conditions). It seems that there is no ideal way available to use prices of long-term contracts for an SPPI.

The examples above show that the accrual principle is very important for services even if it might be difficult to implement. In many cases, not all efforts are made to fully match prices and the time when services are provided. Simple solutions can sometimes be useful if they are easily understandable by users and bearing in mind that the accrual principle is not always rigorously implemented in the national accounts. Thus, while accrual accounting should in principle be respected, it has to be applied with flexibility in practice.

1.6.2 Frequency of price collection

The frequency of price collection can be monthly or quarterly. For the moment in the EU Member States, it has been agreed to collect prices for SPPI quarterly. When collecting prices for a particular period, there are two basic methods:

1. Period prices are an estimate of the average price throughout the period. A period price should take account of price changes that occurred during the period;[24]
2. Point-in-time prices relate to the price on a particular date or sub-period. For example, it might be the nearest trading day to the mid point of the period or the middle week of the quarter or month.

Generally, method A is to be preferred. Point-in-time prices can be considered for use only if they are expected to be representative over the entire reference period (i.e. month or quarter). They should be used with great prudence if the price-collection frequency is greater than one month. Note that the distinction 'period price' versus 'point in time price' does not address the issue of when the services are provided to which the prices belong. For instance, both period prices and point-in-time prices can be surveyed for air transport tickets either long before the actual transport, or in the same period as the transport takes place.

1.7 Treatment of quality change

Assessing the quality of products and adjusting price observations for quality changes are important tasks that price statisticians encounter each time an existing sampled product is replaced by a new one. An indication of the importance of the task is the PPI Manual where three chapters are devoted to issues related to quality changes (Chapters 7, 8 and 21).

The PPI Manual provides a list of methods (par. 7.75) that can be used for dealing with quality changes of products:

Implicit methods:

- Overlap,
- Overall mean/targeted mean imputation,
- Class mean imputation,
- Comparable replacement,
- Linked to show no price change,
- Carry forward.

Explicit methods:

- Expert judgment,
- Quantity adjustment,
- Differences in production/option costs,
- Hedonic approach.

The same quality adjustments methods can in principle be used for goods and services. In practice, however, fewer options are available for services. For example, the hedonic approach can rarely be used, because the quality of services is often made up of intangible factors that are difficult to identify and to measure in quantity terms. Moreover, even where quality factors of service products can be identified, it is often hard to find suitable data to capture gradual changes in the quality of services.

Quality adjustment methods that are feasible particularly for services are discussed in section 3.6 of this guide.

[23] See the PPI Manual, par. 10.123-124.

[24] A more detailed description of these two methods can be found in the PPI Manual, Chapter 6.

1.8 Classifications

Classification systems provide an organizing structure and choosing one constitutes the first step in surveying prices. Once the sub-aggregates within the classification system are selected, an appropriate frame can be identified from which representative establishments and service products can be selected for inclusion in the index. The classification system also determines the structure of the index and defines the weighting system.

International classifications for activities are:

- International Standard Industrial Classification of all Economic Activities (ISIC),
- The General Industrial Classification of Economic Activities within the European Communities (NACE),
- The North American Industrial Classification System (NAICS),
- Australian and New Zealand Standard Industrial Classification (ANZSIC).

International classifications for products are:

- Central Product Classification (CPC),
- Eurostat Classification of Products by Activity (CPA),
- North American Product Classification System (NAPCS).

Classifications are discussed at a general level in the PPI Manual and the discussion needs not be repeated here.[25] Classification aspects relating particularly to services are discussed in Chapter 4 where SPPIs for a set of service industries are introduced. It should be noted that the product classifications provided above are generally only useful as a guide and cannot be used to form components of a weighting structure for an index. This usually has to be done by accessing information from structural statistics or as part of the process for establishing a price index at the 4-digit industry level. More information on these processes is provided in Chapter 3.

1.9 Sample frame and weights

SPPI can be established on the basis of industries, service products or both (see section 1.3). The required sample frame depends on this choice. The use of industry as the basis is in most cases easier because more information on establishments needed to construct a frame is available by industry than by product.

Depending which one of the approaches is chosen, the weighting, interpretation and the usability of the indices are somewhat different. If an index is based on industries, a sample frame is built up of establishments/LKAUs. This means that any secondary activities (that are principal activities for some other industries) of the establishment/LKAU will be included in the sample. On the other hand, in a service-based index only services in question are considered without taking into account in which industry the service provider belongs in the classification of establishments/LKAUs. Consequently, an industry-based index is valid for deflation of total outputs of industries and service-based indices for deflation of the part of services in industry outputs.

For **industry SPPI**[26], the PPI Manual recommends stratifying the sample frame by 4-digit ISIC (or NACE) heading and then by size. Two stage PPS sampling[27] is recommended to select establishments/LKAUs within each heading and then transactions from each unit. Depending on the circumstances, other probability sampling methods may be considered as well and a minimum size criterion be used in sample selection ('cut-off sampling').

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[25] Further information on the classifications and links between them can be found in the following websites:

- UN classification register

http://unstats.un.org/unsd/class/family/default.htm

- Eurostat's Classification Server

http://europa.eu.int/comm/eurostat/ramon/

- North American industry and product classification system:

http://www.census.gov/epcd/www/naics.html

- Australian and New Zealand industry classification:

abs website

[26] The optimum stratification level may be different in small countries.

[27] PPS = Probability proportional to size. Description of the method can be found in the PPI Manual, Chapter 5.

For **product SPPIs**, it is recommended that the sample frame be stratified by service product codes. When feasible, two stage PPS sampling should be employed to select establishments/LKAUs within each code and then transactions from each unit.

For **industry and product SPPIs**, the recommendation for the sample frame is a stratification by 4-digit ISIC headings and then by size. Further, two stage sampling should be employed to select establishments/LKAUs within each heading and then transactions from each unit. Transactions within each establishment/LKAU should be stratified by product code.

For services, it is often more difficult to establish product SPPI than industry SPPI because statistics on industry outputs by service products might not be available. For establishing industry SPPI, data by industry are commonly available via business registers and other sources. However, the situation might be gradually improving because many countries have launched development projects to establish statistics on service outputs similar to statistics in goods industries. Also in practice, where countries compile an industry SPPI at the 4 digit level, they only sample products that are primary to the industry.

The need for revisions to weights depends largely on the service industries concerned. In some industries the contents and structure of service output changes rapidly year to year requiring annual updating of weights. These changes are due to the emergence of new products as well as changes in the pricing system. In some other industries there is no strong need to update weights very frequently because, in general, estimated price indices are not very sensitive to small errors in weights. Also different strategies can be followed in revising weights like updating upper-level weights more frequently than lower-level weights. As a general rule, the PPI Manual recommends that thorough periodic reviews are undertaken for all industries at least every five years to ensure that the weighting structure still corresponds to user needs.

More information on this topic can be found in the PPI Manual.

1.10 Relationship of the SPPI to other major price indices

The SNA/ESA recommends that GDP at current and constant prices should be estimated in the framework of supply and use of goods and services. In principle, price indices should be available for various parts of the supply-use framework. The PPI Manual uses this national accounts framework to illustrate the relationships between different price indices.[28]

Services make up a sub-set of all products produced and consumed in an economy. Their supply and use, and associated price indices comprise the following sub-areas:

- Domestic output of services SPPI ,
- Consumption of services by households CPI,
- Other domestic uses of services,
- Exports of services,
- Imports of services.

In this framework, the SPPI is crucial not only for measuring output of services but also for estimating price development of the use of services in areas where independent price indices are not available. This concerns, particularly, the use of services in intermediate consumption and exports of services.[29] Services used by households are covered by CPIs.

The present guide has adopted as a principle that the scope of SPPI should cover all types of users, even though the empirical focus is on those SPPI where deliveries to businesses play an important role. Nonetheless, there is an overlap between SPPI and CPIs when it comes to the pricing of services delivered to households.

There is no general rule for how the compilation of SPPI vis-à-vis CPIs is best organised. The situation varies between service products, and data sources may also differ between countries. It may be possible to use CPI information to obtain prices for household end users, and in this case the data collection for the SPPI would be reduced

[28] See PPI Manual, Chapter 14

[29] In national accounts based on the supply and use framework, an advantage of using SPPI data on the use side is that consistency of prices in service balances can be ensured

to business-to-business and export if significant. Note, however, that the price concept underlying the CPI is not the same as the concept underlying the SPPI. There may be other cases, where the service output and its prices for different end-users are very similar or cannot be separated in practice (e.g., economy-fare air travel), in which case it may be easier to cover service output prices to all end users in a single estimation.

Statistics by end use, like supply and use tables, are the appropriate tool to identify the relative importance of groups of purchasers (export, intermediate consumption, households) of the output of an industry.

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2. Main pricing methods for SPPI

2.1 Introduction

The compilation of price indices should be based on clearly specified, representative products whose prices are followed over time with due attention to quality change. For services, this principle is often difficult to follow due to the following reasons:

- Services are typically produced and delivered in direct contact with the customer, there is a more frequent occurrence of ***unique service products*** than in the case of goods. A unique service product is one that is only provided once to the specifications of an individual customer, and prices cannot be observed over multiple periods. Various consultancy services fall into this category, making price measurement a daunting task. Explicit or implicit assumptions on quality changes have to be made (typically, constant quality is assumed) that are mostly based on convention rather than reflecting "reality".
- Charging arrangements or mechanisms for the sale of services are often such that it is ***difficult for*** the ***statistician to observe prices*** for a repeated service transaction. Complex and changing bundles of telecommunication services that are on offer are a case in point. Invoicing systems applied by service providers can be very different depending on the industries concerned and may also vary between different service providers within the same industry. Moreover, the same service provider might change the invoicing basis from one period to another.
- Even for simple services with readily available observations on transactions and prices, ***controlling for quality change*** is particularly difficult in the services area and can give rise to fundamental issues such as whether a more rapid delivery of the same service constitutes a quality change or not.

Because of the frequent occurrence of unique products, standard price measurement methods designed for repeated products cannot generally be applied for services. Nor is it possible to provide strict guidelines on how SPPI for particular services should be compiled. Decisions on pricing methods depend largely on circumstances, for which flexible solutions should be found to capture the development of prices. It is also obvious that new methods evolve as more experience is gained on the compilation of prices indices for existing and new services.

This chapter discusses pricing methods with an emphasis on unique services, and on prices and transactions that are ill-specified and difficult to observe. Before doing so, a few remarks are made for clarity of exposition.

First, ***pricing mechanisms*** are charging arrangements put in place by economic operators, and they have to be distinguished from ***pricing methods*** employed by statisticians. In the simplest case of a repeated, well-identified service with observable transactions, the pricing mechanisms and pricing methods largely coincide. Observed prices can be directly used in an index and a statistician will encounter only "normal" compilation problems such as controlling the quality and representativeness of service products contained in an index. For unique service products, however, this coincidence does not hold and the statistician has to decide how best to use information from pricing mechanisms to devise a pricing method. Sometimes proper price data might be found in the market but are inappropriate for use due to rapid changes in the market. In addition equivalent service products may not be transacted in consecutive periods and therefore prices are not available.

Three examples further clarify both concepts and their difference:

1. Car rental. The pricing mechanism is that a commercial (market) list price is charged by the producer. The pricing method is, for instance, the survey of some of these list prices. For this standard service, the mechanism and method "coincide";
2. For some legal services, the pricing mechanism is a percentage fee of the assets

that the service pertains to. The pricing method could be, for instance, a unit value of (realised) hourly rates for the lawyer's activity, dividing total income by worked hours;

3. In a regulated market for postal services, the pricing mechanism is a government regulation specifying prices. The pricing method could then consist of accessing the legal documents with the regulated tariff information.

Pricing methods are those that apply to the process before (elementary) index compilation; they are solely concerned with data that are used as prices in an index. Put differently, pricing methods are procedures applied to make price data (that are mostly based on price mechanisms) eligible to be entered in an index. The index formulae and aggregation methods needed to bring together these basic elements are not discussed in this chapter, and reference is made to section 3.7 and the International PPI Manual.

Second, pricing mechanisms and pricing methods have to be distinguished from the ***nature of services***. Services can be unique by their nature like legal advice. For unique services, transaction prices of comparable service products are not available, and a host of pricing methods are therefore used to circumvent this problem. Other aspects of the nature of a service are the length of provision with its implication for pricing methods. Notice that often there is a direct link between the type of service, the pricing mechanism, and the pricing method. The nature of a service determines (restricts) what price mechanisms and methods are possible and a price mechanism determines (restricts) what price methods are possible.

2.2 Specification of service output

A fundamental principle underlying price indices is to follow prices of products with comparable quality in consecutive periods. This requires that products, whose prices are used in an index, be well-specified. In the case of identical, repeated services the requirement means that price-determining factors of services are identified. For unique services the situation is different, because price-determining factors cannot be expected to be known and the characteristics of service products have to be identified instead. A proper specification is also a precondition for the ability to track changes in the quality of products over time. As already explained, this requirement is particularly difficult to meet for service products.

Pricing methods are processes applied to price data – possibly based on various pricing mechanisms – to make them suitable for use in an index. Price observations that refer directly to specified service outputs are an important ingredient in developing conceptually satisfactory SPPI. On the other hand, if, due to uniqueness of services, specified service outputs cannot be priced in successive periods, this gives rise to time-based pricing methods. These methods are based on the time used for the provision of the service rather than on the service itself. While such pricing methods are common in the service area, they imply that the impact of labour productivity change on price changes may be disregarded. This is a serious deficiency because only prices that are compatible with services finally provided may result in an SPPI that is closely comparable with PPIs for goods, and in comparable volumes for goods when used for deflation.

Generally, a rise in productivity means that a larger volume of services can be produced with a given input. The change in volume may be a consequence of a change in quantity or quality of the services. (Alternatively, a rise in productivity means that output prices fall even though input prices remain unchanged.) When the item is a clearly specified finalised service and prices of this service can be matched exactly over time, there is no need to consider productivity or more generally, to inquire about the reasons for price changes. The delivery of a letter could be an example of such a well-specified and observable service. If the price of sending the same letter under the same conditions falls, this is all the price statistician has to know in order to measure a price change. It is irrelevant whether the fall in prices reflects productivity gains or some other cost change.

When pricing is not based on prices of final services and time-based pricing methods are applied, the implicit assumption is made that the time a service provider of a given qualification and experience spends with a client is the best approximation for the unobserved service flow. Possible change in productivity, implying that a larger volume of services per hour might have

been delivered, is disregarded because only hours are observed.

The pricing methods discussed in this guide are briefly introduced in section 2.3. In light of the above discussion, the aim is to distinguish pricing methods that result in prices of final services from those that result in time-based prices.

2.3 Classification of pricing methods

There is ***no unique classification*** of pricing methods. There are many criteria along which pricing methods can be defined and contrasted with each other. Any classification system that tries to bring together all pricing methods is almost certainly deficient because methods are difficult to classify into mutually exclusive categories. The approach adopted here starts out by using as a criterion the *outcome* of pricing methods and looks at the extent to which a price finally entering an index is based on specified final services or is time-based. Secondly, pricing methods are sub-divided based on *techniques* employed by statisticians in pricing.

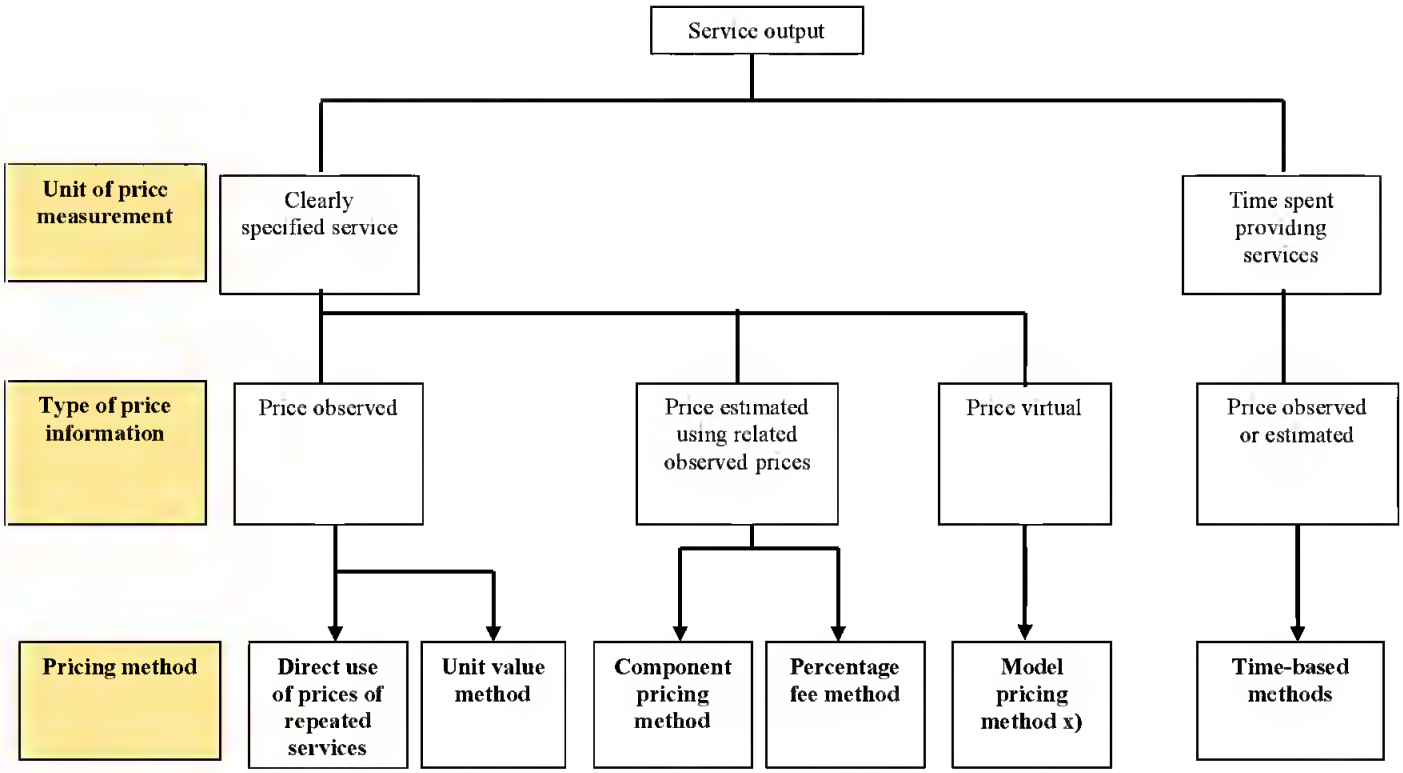
Obviously, if techniques had been chosen as the main criterion in the classification, a different definition of methods would have resulted. For instance, unit values are used not only in the unit value method (section 2.5) but also in pricing based on working time (section 2.9). Limiting the unit value method to pricing of well-specified services highlights the fundamental difference between the two types of pricing methods. In the former, the principle of tracking the development of output prices of equal products is at least attempted whereas in the latter the target measure is price development of working hours (by categories of employees) rather than price development of service products themselves.[30]

The reason for putting so much emphasis on outcomes rather than on technical compilation procedures is that ensuring the international comparability of SPPI is an important long-term aim of this guide. This might not be achieved in near future, but a classification based on outcomes of the approach taken is important in monitoring country practices and in using the information for analysing price and volume developments in countries. Focusing primarily on compilation techniques does not ensure that these aims are met because technically similar compilation procedures may give very different results depending on whether prices underlying SPPI are prices of actual service outputs or prices of working time in the provision of services.

Figure 1 shows the pricing methods as defined in this guide. They are either based on specified final services or are time-based. The left-hand column describes an ideal situation where service output is specified in terms of final services although not necessarily perfectly. The right-hand column illustrates the other extreme, where a service is specified in terms of contents of service provision rather than in terms of the service ultimately provided. The measurement unit in the former case is the service provided and in the latter it is time spent in service provision. When price indices based on these two types of methods are used in deflation, results have different interpretation. In the first case, volume of output is in principle correctly measured (although the result depends how well price-determining factors are specified) whereas in time-based methods the resulting volume can be interpreted as time spent in the service provision. The validity of prices based on working time used in an SPPI depends very much on the services concerned. Issues of this nature pertinent to specific industries are covered in Chapter 4.

[30] Further discussion on classification of pricing methods can be found in the paper by Aurél Kenessey, Benoît Buisson and Richard McKenzie that was presented at the Voorburg Group meeting in Helsinki, 2005. See paper

Figure 1: Main pricing methods



x) Note that model pricing is classified entirely to the group of clearly specified services. However, if the number of working hours is used as the major part of a pricing model and these are assumed to remain the same as in the previous period in all cases, then this would be classified as a time based method

The first of the methods, the **direct use of prices of repeated services,** represents the ideal of using real transaction prices of the same service products in successive survey periods. A special case, contract pricing, is the use of prices in long-term contracts for the repeated delivery of the same or a very similar service in many survey periods. The method is discussed in section 2.4.

In the **unit value method**, prices entering an index are estimated via aggregate value and quantity figures. In principle, the method is only appropriate in cases where services are sufficiently homogeneous. Sometimes, however, it can be regarded as the best option also in cases where the homogeneity requirement is less perfectly met. For example, changes in the market might be very strong and/or prices excessively volatile in which situation any other pricing method is difficult or too costly to implement. Note that the unit value method as defined here is limited to cases where price observations refer directly to service output. Cases where unit values are applied in the estimation of hourly rates are covered in the method 'pricing based on working time'. In addition, for the component pricing method some sub-components might be based on unit values. The unit value method is discussed in section 2.5.

The **component pricing method** is characterised by the use of a number of independent observed prices of output components. The price to be entered into a price index is the sum (weighted or unweighted) of prices of the components. The method is discussed in section 2.6.

Pricing based on **percentage fees** is only applicable if the pricing mechanism bases the price on a percentage of asset value (or price of some other goods or services) that the service is connected with. In this method the price development is based on changes in both the percentage rate and the price (or price index) of the associated product. The method is discussed in section 2.7.

The main characteristic of **model pricing** is that the survey asks for an expert estimate of a price. The data for index calculation are compiled solely for the survey. Any existing enterprise data are used in the estimation but the resulting price itself is fully fictitious. In principle, a basic requirement of the method is that service products are specified and, thus, changes in productivity are expected to be taken into account. This means that efforts are made to estimate changes in required working time rather than assuming it will always be the same as in the previous period. The method is discussed in section 2.8.

Pricing based on working time is often applied for business services where hourly charge-out rates are typically used as a pricing mechanism. Therefore this method measures the price development of working time spent in service provision rather than the price development of the service itself. Pricing may come in different forms. For instance, the pricing mechanism can be based on charge-out rates by type of staff or prices may be built up from costs of service provision. The method is introduced in section 2.9.1 and discussed in detail in section 2.9.2.

2.4 Direct use of prices of repeated services

2.4.1 Standard case

This method concerns the standard case of well-specified, repeated services. These services can be either simple services or packages of services. Pricing of repeated services is standard CPI and manufacturing PPI practice. Producers are asked to select some of their products that are representative of their total output. The prices of these services are followed over time, as are their characteristics in order to control for quality changes.

Prices are ideally actual transaction prices extracted from enterprise records but if these are not directly available they can be estimated by the respondent. Sometimes list prices are used, which relate to standard price lists established by a business for the service products they sell. List prices are chosen to directly match the required service specification or be as close as possible if prices for the exact specification are not available. Sometimes the same list price is not available in two consecutive periods, and it has to be approximated using list prices that are closest to the required specification. In an SPPI list prices should only be used if there are good reasons to believe that they reflect the evolution of actual transaction prices. This is not the case when

discounts vary over time in response to changing market conditions.

While the pricing of simple services is often straightforward, pricing of service packages is more difficult when the structure of service packages changes or when customers switch their purchases towards more favourable packages. For example, in the telecommunication sector a package might consist of fixed amount of talk time and SMS (short message service) with a fixed fee. Either part of the package might change resulting in a specification problem when the service product is re-priced. On the other hand, if an old package remains in the market when a new package is introduced, pricing of the old package might result in bias if its market share declines significantly. Replacing the non-representative service package in an index by another, more representative package might be difficult in practice. This could lead the prices statistician away from the standard case of a repeated service to a situation of unique services where alternative methods have to be considered to ensure pricing to constant quality.

2.4.2 Contract pricing

Contract pricing is a particular case of the direct use of well-specified, repeated services. It is only applicable to a certain type of service and if a certain pricing mechanism is used in the market.

The only **type of service** that this method applies to, are services for which an (almost) exact repetition occurs by the same producer for the same client. Examples of such services are the daily cleaning of an office building, a security service like guarding a building, and weekly road haulage between a factory and a warehouse.

Another restriction for the applicability of this method is that it requires a particular **pricing mechanism**. The mechanism has to be that the producer and the client establish one contract that covers the repeated delivery of the service during a long period, be it a predefined period, for instance one year, or an open ended period. It is necessary for this pricing method that the contract lasts over a sufficiently long survey period, and that service delivery is repeated at least once per survey period. The price stated in the contract often changes without a change of the output stated in the contract. Prices can change by different mechanisms, for instance by yearly renegotiation, by escalation with an index like the CPI[31], or by a clause that states that the producer is allowed to pass on certain cost changes. Payments are typically periodical, e.g. every week or month the same amount is paid.

In short, this method can only be applied (1) if the (chosen unit of) service[32] is repeatedly provided under one and the same contract over many survey periods and at least once per survey period and (2) if the surveyed prices reflect the same service each survey period. If these conditions are not met, contract pricing is not possible as the pricing method. Long lasting contracts for unique services like a three year engineering project, cannot be surveyed by this pricing method, because different services (or parts of a big service) are produced every survey period. For such services, model pricing or a time-based method are the main options. Also, framework agreements under which different amounts of service or different services are delivered each period are not suitable for contract pricing.

It should also be noted that contract pricing is not recommended in cases where services are the same in each period but payments are made less frequently for example in the case of large up-front payments. There is no self-evident way to allocate these payments over the contract period to determine prices for each sub-period and to apply the accrual principle. In these kinds of contracts it is recommended to apply other pricing methods e.g. model pricing.

The contract pricing method works basically as follows:

- A number of contracts are selected in a dialogue with each respondent. The

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[31] There are anecdotes where contract prices are escalated in year *t* by the change of a PPI from year *t-2* onto *t-1*, and this change being surveyed again for PPI compilation. This is awkward, but not wrong from a survey point of view.

[32] It does not matter what the unit of 'a service' is, either 'all cleaning under one contract' can be regarded as one service, or a unit of service delivery can be chosen as e.g. one trip, one days' cleaning or a week of guarding. Another option, and easiest for practical purposes, is to adhere to what the surveyed price reflects: a price per trip, or per day, or the total price of the monthly or quarterly payment. In the last case, the unit of service can be 'quarterly charge for twice-a-week road transport'.

product description identifies the client explicitly[33]. The nature and quantity of the service that the price belongs to, is also stated clearly, e.g. the total weekly or monthly service (coinciding with payment), or the price per unit of service delivery, like one transportation trip, one days' cleaning or an hour of guarding.

- The price of this product is surveyed every period although respondents in some industries have stated that prices change so rarely that the survey frequency should be lower than the periodicity of SPPI calculation. In these cases, a surveyed price is valid for a number of periods.
- If there is any change in the actual service, a quality correction has to be made for which standard methods can be applied. For example, an office cleaning contract changes to only three instead of five times cleaning per week or the weight of the load of a road haulage trip goes up from 10 to 14 tonnes.

The difference with the standard case described above in section 2.4.1 is that contract pricing is based on a single transaction, whereas the standard case is based on multiple transactions, possibly for different clients. Unlike the standard case, a contract and its price are usually unique for a particular client. However as they are repeated over many survey periods the 'unique product problem' does not apply here.

[33] The client description can be limited to some client identifier like a number, if the respondent desires this for confidentiality reasons.

Box 1. Examples of contract pricing in the Dutch road haulage SPPI

Prices are taken from contracts in nine consecutive periods. Surveying takes place every quarter, even for the prices that stay the same for a long time. Most contracts include a clause that allows a diesel surcharge if the diesel price rises above a certain level. Examples are only modified to make the identification impossible.

	2003				2004				2005
Description	I	II	III	IV	I	II	III	IV	I
Tank transport in bulk. 30,000 litres. From Amsterdam to Arnhem (104 kilometre). Including loading, unloading (both three hours). Price on the invoice, for client nr. 6347. Contract price: 1 year fixed and diesel surcharge. Price per trip.	325	345	366	366	370	370	377	388	375
Truck and trailer 25 tonnes. From Assen to Mayer (Germany), 217 km, ± 6.5 hours. Advance notice of 3 days. Excluding return cargo, including loading, unloading and reimbursement for waiting. Including German toll (start in 2005). Contract price for a fixed client nr. 10502. Price per ton.	18.92	18.92	18.92	18.92	18.92	18.92	17.43	17.78	21.39
Distribution of cattle feed (calf milk powder). Transported by silo, 16 tonnes. From Enkhuizen to two unloading addresses in the Netherlands. Including return cargo, loading, unloading and reimbursement for waiting. Contract price for a fixed client: Drankovil. Price per ton	10.89	11.05	11.05	10.73	10.79	10.89	(9.50)*		

*) The respondent has lost the third trip in the third quarter of 2004 to a competitor. This respondent knows that this service will be carried out by the competitor for 9.50 per tonne per trip. The respondent selects another contract for which he provides prices starting in this third quarter of 2004. The usable price relative of this contract is then available in the fourth quarter.

There is anecdotal evidence about 'sales biases'. This concerns new contracts that are won by agreeing to a low price, at which no profit or even a loss is made. Once the client is satisfied, prices go up to regular market levels. In strict contract pricing the resulting SPPI is in danger of rising too fast, as it rises with rising prices. A solution is to avoid inclusion of prices that are obviously sales prices.

It is necessary to keep in close contact with respondents about how prices change *for the client,* even if another producer had the contract before (new contract entering the index) or another producer wins the contract (contract disappearing from the index). See also the third example in Box 1. There is a danger of a changing contract bias if any substitution of contracts included in the index is treated by an easy link to-show-no-price change substitution. On the other hand, adhering too long to old contracts may lead to a new item bias. Alternatively, the model pricing method (see section 2.8) can be a useful addition to contract pricing.

The contract pricing method is easy to apply, and the restriction to use it only in cases where payments are made on an accrual basis means that

for each individual contract the prices are fully in line with corresponding service output. However, when applying the contract pricing method, a crucial problem is how well the resulting price index reflects evolution of market situation in the industry concerned. In other words, to what extent individual contract prices agreed at the date of signature for several future periods can be held representative for the whole industry.

In those service industries where the prevailing pricing mechanism is contract pricing, to ensure representativeness two issues should be considered:

1. Contracts to be included in the sample should preferably reflect different volumes of service deliveries because price developments may vary with the size of the customer;
2. A relatively large sample is required. Otherwise the resulting index may become too sensitive to the spread of contract periods in the sample. In other words, due attention should be paid to the temporal representativeness of the sample to capture the evolution of the market situation. It is possible that the spread of contract periods is highly seasonal, e.g. contracts are largely signed at the beginning of the year.

If there is no significant seasonal pattern in the spread of contract periods over the year and services provided by the industry are relatively homogeneous, the contract pricing method and a representative sample of contracts might result in an index that represents relatively well the whole industry. On the other hand, if the seasonal pattern is strong, it is particularly important to also collect prices that are based on other pricing mechanisms than contract pricing. There is no reason to assume that a seasonal pattern concerns the whole industry. The more prevalent the use of other pricing mechanisms is in the industry the more important it is to enlarge the sample. This would naturally imply the use of multiple *pricing methods* across different respondents for the industry concerned.

2.5 Unit value method

In the unit value method, service output is sub-divided into homogeneous sub-sets for which value and quantity data are available. Prices for an SPPI are then estimated by dividing the value of service outputs by the corresponding output quantities.

Evidently, the unit value method is appropriate in cases when sufficiently homogeneous sub-sets of outputs can be found where consistent value and quantity data are available. In practice, the homogeneity requirement is difficult to meet, and even a very detailed sub-division of output does not always ensure that services are fully homogeneous. There are, however, cases such as postal and courier services where unit values can often be considered entirely appropriate.[34]

In spite of difficulties to meet the homogeneity requirement, the unit value method proves sometimes to be the best available alternative, even for complex services. An example is telecommunication services where rapid technological development and frequent changes in invoicing system make the implementation of other alternatives so difficult and costly that a judicious use of the unit value method turns out to be a feasible and cost-effective option. However the homogeneity requirement is not strictly met because the size of contracts (which is an important price determining factor) is largely ignored in the method. Detailed sub-division of services is of the utmost importance to hold this deficiency to a minimum.

When using the unit value method, one should be aware that the homogeneity of products underlying unit value prices might deteriorate over time. As a consequence, changes in the composition of services within a category can lead to changes in the unit value index that are wrongly interpreted as price changes. Thus, the sub-division of output needs to be checked frequently and updated if necessary to avoid an index bias.[35]

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[34] National accountants often directly use **quantity indicators**, where volume of output is a weighted average of quantity indices based on base year weights. The corresponding price index is the change of output divided by the resulting volume index. The method is used because detailed turnover data might not be currently available to estimate unit value prices. To give satisfactory results, a basic requirement in the method is that quantity indicators cover all output exhaustively.

[35] It might also be appropriate to use the Fisher formula in the estimation of price indices for industries undergoing rapid technological changes. This would require that quantity and turnover data are collected

A problem sometimes encountered with unit values is that the required data are rarely available in time for inclusion in current quarter estimation. This means that unit value indices are often lagged by one quarter (or month) or, alternatively, indices are published preliminarily and revised when final data become available.

Box 2. Example of unit value prices

UK Business Telecommunications: local calls

	Revenues (£m)	Volumes (million minutes)	Unit Values (£ per minute)	Index Value
Year t				
i	300	14 000	0.02143	100.0
ii	280	13 500	0.02074	96.8
iii	260	13 000	0.02000	93.3
iv	240	12 500	0.01920	89.6
Year t+1				
i	220	12 000	0.01833	85.6
ii	200	11 500	0.01739	81.2
iii	180	11 000	0.01636	76.4
iv	160	10 500	0.01524	71.1

2.6 Component pricing

In the component pricing method[36], a service product or a base model of the service is agreed upon with the surveyed enterprise. Although the service as a whole may be a fictitious composite service, it is composed of elements for which actual prices can be observed or estimated. In each subsequent period the respondent enterprise supplies the price for each individual element of the model. The statistical office then combines this information to compute a price index for the composite service. There are different ways of combining or aggregating across the elements for which prices have been collected. Methods include:

- The use of existing bills or contracts to draw up a user profile. For example, a typical bill of a telecommunications client has as its elements local phone calls, national calls, etc., as well as a distribution of total communication time between these elements. A typical distribution constitutes a user profile and provides the weights to construct a composite index of communication services prices on the basis of the various components from existing bills. Sometimes not all elements of composite prices can be covered. Where this is the case, it has to be assumed that the price of the missing element moves roughly in line with the average of the other elements. Omissions may also be acceptable if the user profile shows a very small weight for the missing element.
- The use of output or consumption weights. Composite prices are then constructed by collating prices of components using the formula for weights provided by the respondent enterprise. This kind of pricing can be considered for use in transportation services, for example.

The component pricing method is not widely used except in telecommunication services. In methodological papers on SPPI for these services, the method is sometimes called "bill method". A standard bill is defined where the composition of the bill is based on the average number of connections and call minutes in different service categories (such as a given number of peak and off-peak minutes in national and international phone calls). These model bills are re-priced every period. Prices in each service category can be monitored separately or they can be summed by using appropriate weights to form a component price.

The component pricing method differs from the direct use of prices of repeated services insofar as the former involves computing a price from various components and no transactions are necessarily made at this price. Instead, in direct use of prices of well-defined repeated services, transacted prices are used *as such* in the SPPI compilation, whether or not there exist sub-

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continuously to update weights for each period. Weights of firms in the sample become quickly outdated when prices change significantly like in mobile phone and internet services.

[36] The PPI Manual (paragraph 6.83) distinguishes specification pricing from component pricing of which the latter is used in connection of shipbuilding. The term component pricing as used in this guide covers both parts.

components for which prices are available separately.

Box 3. An example of component pricing

Pricing of local telephone services (called "unit value method") in the USA's PPI.[37]

Average number per access line (weight) in the base period is obtained by dividing the total number of units for each type of charges by the total number of access lines.

Average revenue per unit in period t is obtained by dividing revenues for each type of charges by the total quantity used of each charge.

Weighted revenue in period t is calculated by multiplying average number per access line by average revenue per unit. The price is the sum of weighted revenues.

Type of charge	Average number per access line (a)	Average revenue per unit (b)	Weighted revenue (a) x (b)
Access line	1.000	26.7530	26.7530
Usage charges based on time:			
Peak minutes	162	0.2589	41.9418
Off-peak minutes	133	0.0824	10.9592
Roaming minutes	10	0.9722	9.7220
Usage charges other than time:			
Landline, per call	2	0.1500	0.3000
Other charges, daily rate	1	1.5000	1.5000
Features/Options and feature packages:			
Custom calling package	0.65	3.4600	2.2490
Call waiting	0.20	4.8500	0.9700
Call forwarding	0.10	5.1500	0.5150
3-way conference	0.05	5.7500	0.2875
No answer transfer	0.10	4.2500	0.4250
Voice messaging	0.20	4.8000	0.9600
Total (Price in period t)			96.5825

[37] For details, see the following paper, Deuchars G., Moriya K., Kumihoro J. Price index for telecommunications services, 16th Voorburg group meeting, September 2001. paper

In component pricing, prices of sub-components should be based on prices of truly transacted services. In this respect the method differs from model pricing where the price is largely based on estimates rather than being built up from sub-components for which true transaction prices are available. Moreover, prices of sub-components should not be hourly rates or other time-based prices. If such kinds of combined prices exist in practice, the pricing method belongs to time-based pricing (see section 2.9) rather than to component pricing. A reason for their exclusion in this class of methods is that otherwise the nature of resulting final price would become blurred. The importance of this principle is particularly apparent in cases where time-based pricing is applied for sub-services are subject to strong technological development, and for which their weight in the total price is high. For example, due to adoption of more advanced technology, hourly rates might go up and working hours down but still "real" prices and volumes of services might remain stable. A fixed weight structure, even when updated frequently, does not capture these changes and a biased sub-component price ends up contributing to the final price. Therefore, it is recommended to use model pricing in this kind of situation.

An advantage of component pricing is its flexibility of use. Care should be taken to ensure its representativeness over time and, therefore, sub-components and weight structures should be updated frequently

2.7 Percentage fee method

Sometimes, the value of output of a service product consists of a commission fee, which is calculated as a percentage of the value of contracts, assets (e.g. the services of real estate agencies) or other products. In this situation, the price of the service can be estimated by updating the price in the previous period via the following formula:

$$p_t^s = p_{t-1}^s \times \frac{m_t}{m_{t-1}} \times \frac{P_t}{P_{t-1}}$$

where:

- p_t^s is the price of the service output in period t,
- P_t is the value of contract, asset or other product in period t,
- m_t is the percentage fee in period t that applies to the value P_t .

The percentage fee method is valid if the underlying goods or services are sufficiently homogeneous over time. Note also that the method is equivalent to estimating a price directly on the basis of fees associated with the same product in consecutive periods. However, capturing the price development by applying the described formula is less data demanding because there is no need for goods or services (i.e. an asset or contract) to be exactly the same in two periods but only for their price development to be known (e.g. a price index for the asset or contract exists).

One notes that percentage fees as such are pricing mechanisms and, by assuming that the changes in service prices follow the price development of the underlying product multiplied by changes in percentage rates, they become a pricing method. A pricing mechanism based on percentage fees does not automatically ensure that the percentage fee method can be used.

A special kind of application of the percentage fee method is where the pricing mechanism is based on a scale with varying percentages that depend on the value of the underlying product. Typically, the percentage points that determine the fee decrease with increasing value of the product.[38] In this case, only products in the same scale category can be taken as homogeneous, and the percentage fee method has to be used separately for different categories. However, the same product (although not directly observable) might, e.g. in situation of inflation, move up to a different category in the scale where a different commission is applied. To avoid a bias in an SPPI, results of the percentage fee method should be adjusted to take into account these phenomena.

One notes also that as a consequence of the assumption that the price of the service is related to the price of the underlying asset or product, any

[38] An example of this is *ad valorem* pricing which is often used in legal services. In this pricing mechanism fees are either based on a proportion of the value of the claim or they relate to price classes which represent the various values of claims. The fee might also change progressively. See section 4.11 Legal activities

volume developments (quantitative and qualitative) of products will be directly reflected as changes in the volume of services. For example in Box 4, qualitative development of computers results in an increase of service volume although no additional work is required from the enterprise that leases them. Thus the method is very different from the approach where the price and volume development of the service (margin) is targeted directly.

Box 4. An example of percentage fee method

In the example, sample prices are calculated by using percentage fees and price indices. For each survey period (*t-1*, t, *t+1*,...), a price statistician collects data on percentage fees and combines them with price indices for the products concerned.

Service sample price = percentage fee (%) x price index of the product.

Sample service	Period	Percentage fee (%)(a)	Price index of personal computer / copying machines (year t_0 = 100) (b)	Sample price (a) x (b)
Monthly fee for leasing a personal computer valued at 250,000 yen for 3 year contract	t-1	3.0	86.5	259.5
	t	3.1	83.0	257.3
	Change (%)	**+3.3**	**-4.0**	**-0.8**
Monthly fee for leasing a copying machine valued at 1,000,000 yen for 5 year contract	t-1	2.6	95.0	247.0
	t	2.7	94.0	244.4
	Change (%)	**+3.8**	**-1.1**	**+2.8**

2.8 Model pricing

2.8.1 General features of the model pricing method

The model pricing approach is the most appropriate alternative to be used for industries where service outputs are predominantly unique. The method[39] requires the respondent to quote in each period a price for a standard service whose specifications are held constant. A model can either be a service that has never been observed as such or it can be a service that has been observed in the past, but not during the pricing period. In all cases, the service product is non-observable (virtual) at the time of data collection. For example, an engineering agency is asked to select a representative contract which they have signed in the past and for each period to quote what their price would be to undertake that project if it was up for contract in the survey period.

It is important that although model prices are not based on observed market transactions, estimates should capture prices prevailing *in the survey period*. It is clear that this is the case for small contracts where data in enterprise records can be directly used in the estimation of model prices. However, the same principle applies also when a contract covers several periods. The conditions and prices should still apply for those prevailing in the survey period because deviating from this rule would mean that the accrual principle was not followed and this could imply biased measures of service volumes when SPPI are used for deflation.

Noteworthy, in the case of contracts that last several periods, model prices differ from prices of actual tenders where future changes in inflation, taxation etc. might be taken into account. They

[39] See also PPI Manual paragraph 6.83

are artificial in the sense that project costs and mark-ups represent only the market situation in the survey period although various stages of a long-term project become actual at different points of time. On the other hand, relying only on present price levels is also an advantage from a practical point of view because there are fewer uncertainties in the estimation and base data used in the estimation may be directly available.

Model pricing is used for unique products for which price estimation, unlike in component pricing, cannot necessarily be based on actual transaction prices of sub-components. It is appropriate particularly in similar situations where time-based methods (see section 2.9) are widely used. Compared to time-based methods, its obvious advantage is that the method is in principle based on clearly specified service products whereas in the time-based methods this is not the case. In other words, prices of same services (although virtual ones) are followed over time and, thus, changes in productivity are taken into account in prices. In practice, the difference is not necessarily very significant because data providers might not be able to evaluate how much more or less time a service provision requires compared to the previous period.

2.8.2 Estimation of model prices in practice

Different service industries set different requirements for a model. Whatever type of model is selected it is essential that the model is specified in sufficient detail, so that the respondent reports prices for that defined model and no variation from the model occurs over time without notification to the statistical agency.

In estimating the price, the following factors should in principle be taken into account:

1. Labour costs (staff by skill or experience and numbers of hours);
2. Overheads;
3. Gross profit margin (the representative margin that would apply in the current competitive climate).

For each pricing period the respondent will need to "re-cost" each component. Special attention needs to be paid to ensuring that the model describes an output with a transacted price and not a list of input components. It is particularly important that labour input is adequately re-estimated reflecting productivity changes. The respondent must therefore come up with a change in the number of hours needed for the production of the model described in output terms, e.g. it used to need 1000 engineer hours, now it needs only 930. If this does not happen, the model pricing method has the same 'productivity problem' as time-based methods. Models might also have to be modified from time to time to ensure that they are the main representative of the type of outputs and production methods used by the enterprise. It is difficult to evaluate how well the assumptions to be made reflect reality and particularly estimating the working time required for the provision of a model service is not easy and might become largely subjective.

The profit margin quoted should reflect actual business conditions in the pricing period, and this component is therefore expected to fluctuate with market conditions (i.e. higher in boom periods and lower, sometimes even negative, in recession periods).

In model pricing, models used might be hypothetical and/or based on a real transaction made in the past. Perhaps the most convenient way to implement the method is to rely strongly on actual data from the recent past. A model could be, for example, **based on a contract that was made in the previous period**. Use of recent data has a number of advantages, for example:

- Changes in market conditions will be better taken into account,
- Constant quality of service products will most likely be better ensured,
- Representativeness of service products and prices are better ensured,
- It is easier for respondents to estimate prices. Fresh data are available to make appropriate adjustments in cases when some features or characteristics of the service change.

On the whole, compared to a hypothetical or old model, model pricing from the previous period should give better quality results. This may be particularly the case if respondents have not undertaken any work in the recent past and are not tendering for any such work related to the hypothetical model. Available base data for pricing might differ depending on the service and

service provider. Typically, they include data on charge-out rates applied in service projects and various data on costs. Detailed enterprise data on the previous period and similar data on the period under survey provide the best possible framework to capture price development.

The starting point is to select a specific service and describe the details of that service. The respondent is asked to price the same service in t-1 and t rather than assuming from the outset that required working hours by staff category determines a service as in the hourly rate method (see section 2.9). That means that although price changes are mostly stemming from changes in hourly rates, overhead and profit, some changes might also originate from changes in the number of working hours and other features. Specifically, if a different number of hours or a different mix of personnel and their hours are required to provide the exact same service or contract in t, then those factors have to be updated and the resulting changes shown as price changes. Note, however, that if the resulting price changes are large then the respondent needs to be contacted and asked to explain why such a large change in number of hours is required to provide the same service.

Changes might be a result of technology changes or regulation changes which mean that the exact same output is provided with a change in the amount of inputs. In this case recording the difference as a price change is fully justified. On the other hand, if it can be concluded that the change in inputs really does result in a change in the output (or the service being provided), then the change is not a price change. The information can be used in updating the service description but the price change is to be linked out.

Because the respondent is being asked to price the same service in period t-1 and t, the unit of measurement is actually a price movement. This differs from the normal situation where a respondent is asked to provide only a price for each sampled service product for the current period of reference. Therefore, in using this method, the reported price movements collected each period for the model should be linked together to measure the evolution of price.

Box 5: Example of model pricing[40]

BUILDING RELATED ENGINEERING, FIXED FEE, QBS (Qualifications Based Selection) CONTRACT.
PROJECT TITLE Design for hospital addition (surgical)

FEE BREAKDOWN

Hourly rate	Hours	Multiplier (overhead costs, mark-up)	Total fee/invoice
(a)	(b)	(c)	(d) = (a) x (b)x (c)
25 4	67 87	2 35	4051 05

Competitive discounts included in reported price

UNIT OF MEASURE: Billing invoice, estimated net price

Ideally, the model is a recently completed project. The chosen model is priced in the base period and all subsequent months' prices are estimated based on the model. Respondents are asked to provide the hourly labor rates that would be charged if the firm's employees were to perform the described tasks for a similar project for a similar buyer during the pricing period. If changes in worker efficiency allow for these same tasks to be performed in either more or less time than in a previous period, then respondents are asked to adjust the number of hours worked as well. Absent any changes of this kind, however, the number of hours worked should remain fixed.

Respondents are also asked to update the multiplier that includes overhead costs, mark-up and profit. Overhead charges are updated to reflect the current market costs of the operating expenses that make up the firm's overhead. Respondents are asked to estimate the mark-up based on what the firm's mark-up (including profit) would be if they were to perform a similar project with a similar buyer in the current pricing period.

A problem with model pricing is that the workload imposed on the respondent is relatively large even in cases when models are based on service products recently provided by enterprises. This implies a risk that the respondent will not take the exercise seriously and report model prices that remain unchanged for several periods. Therefore, it is important to be in regular contact with respondents to ensure that the prices reflect adequately the evolution of the market situation.

[40] See also examples on model pricing in section 4.15. On the use of model pricing for Legal services, see the paper presented at the Voorburg Group meeting, 2001 (paper). An example from New Zealand can be found in Attachment 2 of the paper.

2.9 Pricing based on working time

2.9.1 General remarks

Pricing based on working time differs from other pricing methods in the sense that the price of the service finally provided is not identified but prices of time spent in service provision are used instead. Services are assumed to correspond directly or predominantly to different types of chargeable hours, actually worked for a client.

At first sight, there is nothing wrong in using prices of chargeable hours in SPPI. They look like any other prices and are similarly observable by clients and price statisticians. However, hourly rates represent pricing mechanisms rather than prices of real services. The price of a real service is made up of all payments to the service provider and it is this total price rather than the hourly rate which purchasers of services are finally interested in and which price statisticians should, if possible, collect. How valid prices based on time-based pricing methods are for direct use in SPPI depends largely on the services concerned.

Characteristics of the method based on prices of working time become apparent when a time-based index is used in deflation. If a price index is assumed to equal the development of hourly rates, the resulting volume measures the time devoted to the service provision (number of working hours) rather than the volume of services themselves. No change in productivity is reflected in these measures except the one stemming from changes in the staff structure – productivity development is slightly positive if the share of higher-paid staff goes up and is negative in the reverse case. Within each staff class productivity change is not picked up.

The assumption of unchanged productivity in each staff class is very strong particularly in a situation where the staff structure is under change. Changes in the staff structure often mean that the contents of work change within categories. For example, an increased share of professionals might mean that professionals take over, with help of advanced technology, some tasks that support staff had before. Thus, counter to the principles underlying the method, the volume and contents of professionals' work change. An adjustment procedure is needed, because of a quality change of the unit priced, the chargeable hour. It depends on actual situation and data availability how adjustments are made in practice. However, this does not solve the productivity problem which would require that "real" service output should be identified.

Acquisition of office machinery, software and other capital are expected to improve real service output and productivity. The time required in the service provision might shorten and the quality of services might change. Thus, SPPI based solely on time worked for clients, tend to be biased particularly in those service industries where capital is greatly used in production.

Nevertheless, hourly rates represent observable pricing mechanisms and are a natural starting point for the compilation of SPPI. For some services better options than hourly rates are hard to find. In these cases the resulting SPPI might be meaningful in the short-term but in the long-term a risk of bias is imminent depending on the type of service. There are very few market services where no productivity development can be expected.

Note that methods based on working time are sometimes also used when the pricing mechanism is not time-based for example in the case of *ad valorem* pricing[41].

2.9.2 Time-based methods

Several time-based methods can be distinguished that are briefly discussed in this section. In principle, they can be classified into two main categories:

1. Methods that measure *directly* prices of working time spent in the provision of services;
2. Methods that do not measure directly prices of working time but use *time-based measures as a part of estimation* and, thus, the resulting price is predominantly time-based.

A problem to be encountered is that the method is sensitive to changes in the scope of billable working hours. For example, if support staff is ceased to be charged separately and charge-out rates of professionals increase to account for this, then the resulting price index would increase and in theory the estimate of volume change for the industry would decrease after deflation even

[41] See section 4.11 Legal activities

though the actual service output is unchanged. Put differently, savings gained by a more efficient use of staff are not reflected in prices but the index becomes upwards biased. A similar example is where charge-out rates for professionals increase due to application of new technology, which allows them to complete tasks quicker thus reducing their billable hours whilst providing the same service to clients.

Therefore, when using the time-based methods, a statistical office needs to be vigilant to try and identify if changes in the coverage of billable hours have taken place and to adjust for them as appropriate (i.e. by splicing out any changes in charge-out rates which do not relate to pure price change). This can be achieved by a variety of mechanisms, for example through querying changes in hourly rates by asking specific questions on the form whether the setting of charge-out rates between the previous two periods has been influenced by factors such as changing technology, administrative reorganisation, changes to billing structure etc. Adjustments might improve an SPPI at least by eliminating some volatility in prices. However, to make adjustments properly, service products have to be explicitly or implicitly identified, in which case the method would fall into the category of model pricing rather than belonging to time-based pricing.

2.9.2.1 Direct measurement of working time

The target measure is directly the price of chargeable working time. Thus, the method is in principle straightforward. However, the availability of price data varies in practice and therefore the method has several variants.

a) Hourly charge-out rates

The hourly charge-out rate method represents the simplest case where transaction prices are available by labour categories. Respondents provide average hourly rates charged subdivided by type of labour that can be taken directly from ongoing projects or – more subjectively – they can reflect the respondent's estimate of the general market situation. The overall price change is a weighted average of changes of charged hourly rates in different labour categories:

$$P_t = \frac{\sum_i h_t^i r_t^i}{\sum_i h_t^i} \quad ; \quad P_{t+1} = \frac{\sum_i h_t^i r_{t+1}^i}{\sum_i h_t^i}$$

where:

P_t = price in period t,

r_t^i = average hourly charge-out rates in staff class i in period t,

h_t^i = hours worked in staff category i in period t.

In the method, prices are estimated as weighted averages of hourly rates. Another kind of charge-out rate method is where average hourly rates for staff classes are used directly in an SPPI. These kinds of *unit rates* are called average "realised hourly rates" in the Netherlands and "fee income per grade of worker" in the UK. As with all unit value indices, the homogeneity of the classes is an issue.

$$P_t^i = \frac{R_t^i}{h_t^i} \quad ; \quad P_{t+1}^i = \frac{R_{t+1}^i}{h_{t+1}^i}$$

where:

P_t^i = price (unit value) in staff category i in period t,

R_t^i = total of revenues in staff category i in period t ,

h_t^i = hours worked for clients in staff category i in period t.

Box 6. Example of a PPI based on realised hourly rates

The income in Euro's and the number of hours worked are provided in each period via the survey. From these, the realized hourly rate is calculated as their ratio (for instance, in the top line 147 991 / 2 980 = 50 € per hour). After calculating these realized hourly rates for both the base period and the comparison period, an item index is calculated for each item. In the example below, the hourly rate of the experienced drawer in the two periods are 50 and 55 € per hour respectively. The item index for experienced drawer is 55 / 50 = 1.10.

Base period

	Income (€) (a)	Hours worked (b)	Realized hourly rate (income/hours worked) (a) / (b)
Experienced drawer	147 991	2.980	50
Consultant-engineer	18 000	226	80
Designer	163 090	1 624	100
Senior project manager	47 010	471	100

Comparison period

	Income (€) (a)	Hours worked (b)	Realized hourly rate (income/hours worked) (a) / (b)	Item index
Experienced drawer	100 200	1 809	55	1.10 (=55/50)
Consultant-engineer	22 456	313	72	0.90
Designer	120 668	1 050	115	1.15
Senior project manager	50 505	533	95	0.95

b) Hourly list rates

Transaction prices of working hours are not always available. However, many companies compile a list of external commercial hourly rates for different staff levels. The classification of labour might vary between enterprises. These base data are easy to use in an index. On the other hand, some enterprises, particularly small ones, may have individual rates per person that are typically drawn up once per year and, moreover, the rates might often serve as a reference rather than as the charging rates actually transacted. If so, adjustments based on the difference between realised and implied revenues are of particular importance:

$$P_t = \frac{R_t}{R_t^*} \times \frac{R_t^*}{\sum_i h_t^i} \quad ; \quad P_{t+1} = \frac{R_{t+1}}{R_{t+1}^*} \times \frac{\sum_i h_t^i r_{t+1}^{i*}}{\sum_i h_t^i}$$

where

P_t = price in period t,

r_{t+1}^{i*} = average hourly list rate in staff category i in period t+1,

h_t^i = hours worked in staff category i in period t,

$R_t = \sum_i h_t^i r_t^i$ total of realised revenues in period t,

$R_t^* = \sum_i h_t^i r_t^{i*}$

= estimated total revenues in period t.

As in the case of hourly charge-out rates, the method can also be applied separately for individual staff categories (unit rates).

It is important to ensure that total of *realised* revenues used in the adjustment is consistent with *estimated* total revenues. This means particularly that data on realised revenues are accrual rather than cash-based. Meeting this requirement is often not possible and, therefore, the ratio of realised and implied revenues might have to be evaluated independently. In other words, the adjustment ratio to be used is an estimate on average discount rate. As in the case of normal discounts, there is no need for adjustments if discounts are the same in consecutive periods.

Results of the method are closely comparable with the ones of the hourly charge-out rate method. To be exactly the same, adjustment for discounts should be made and, in addition, the relative differences between real and list prices should be the same in all categories of labour.

c) Wage rates

Sometimes no charge-out rate data are available because the invoicing is based on a system other than the direct use of hourly rates. Instead, data on hourly wage rates might be used as a starting point in these cases. Respondents are asked to provide data on wages for a number of classes of professionals and additionally the number of hours worked for clients by each class. A strict precondition is, however, that wage rates are adjusted to correspond to revenues. This means that wage rates have to be multiplied by an estimate on the ratio of revenues and wages.[42]

$$P_t = \left(R/W\right)_t \times \frac{\sum_i h_t^i w_t^i}{\sum_i h_t^i} \; ; P_{t+1} = \left(R/W\right)_{t+1} \times \frac{\sum_i h_t^i w_{t+1}^i}{\sum_i h_t^i}$$

where:

P_t = price in period t,

w_t^i = average hourly wage in staff category i in period t,

h_t^i = hours worked in staff category i in period t,

R_t = total of revenues in period t,

$\left(R/W\right)_t$ = revenue/wage ratio in period t.

Like in case of hourly charge-out rates and hourly list rates, the method can also be applied separately for individual staff categories (unit rates).

Box 7. Example of a PPI based on wage rates

The data in the first two lines are surveyed. If the wages change only twice a year, bi-annual surveying suffices. The revenue/wage ratio (R/W) on the other hand changes faster. The price is the average wage multiplied by the R/W ratio (third line).

Quarter	1 (base)	2	3	4	5
Wage	40 €	40 €	41 €	41 €	45 €
Revenue /wage ratio (R/W)	2.00	1.90	1.85	1.95	1.90
Price (wage*R/W)	80.0 €	76.0 €	75.9 €	80.0 €	85.5 €
Price index (q1 = 100)	100.0	95.0	94.8	99.9	106.9

The wage rate method is very sensitive to the estimation of the revenue/wage ratio and, therefore, a strict correspondence between revenues and wages is essential. Note particularly that revenues should be accrual and **net of any sub-contract costs** to provide comparable prices for consecutive periods. With a high quality ratio, results of the wage rate method are closely comparable with results obtained when using the previously described time-based methods. Whether the quality of results is better or worse depends, which one of the scales, wage or charge-out rate scale, reflects better differences in the performance of staff in various categories of labour.

[42] Note that in methodological documents on SPPI the method is sometimes called *wages with mark-up* or *input with mark-up* in the sense that mark-up includes also administrative and other costs. In the SNA terminology, mark-up corresponds to net operating service or return of capital, and does not include any current costs. Therefore, to avoid confusion, the term mark-up is not used here.

d) Other direct measures of prices of working time

Sometimes data on working time are not available on an hourly basis but can be found e.g. in terms of working days. In these cases procedures are in principle the same as in the case of hourly rates. Only the unit used in the estimation is less precise and this may influence the accuracy of results.

2.9.2.2 Methods predominantly based on prices of working time

The category "methods predominantly based on prices of working time" is reserved for practices where a price is not directly time-based but time-based measures are used as building blocks in the price estimation. In other words, the resulting price is not fully measured in terms of a clearly specified service. For example:

- Prices are made up of several sub-components that include, for example, compensation for a fixed number of hours of work to provide a given service. As explained in section 2.6, a risk of bias would be in this case particularly high if time-based prices were used for sub-services that are under strong technological development, and when their weight in the price is high;
- Prices are virtual and, thus, resemble model pricing but the working hours underlying the price are always assumed to be the same as in the previous period rather than based on genuine evaluation;
- Prices of fees that are associated with service projects or contracts whose price development are measured using a time-based method;
- As pointed out before, an important aim of the classification of pricing methods is to monitor the characteristics of resulting price indices. Therefore, it is essential to separate time-based methods from those ones where price evolution of identical services is targeted.

3. Practical aspects of the development process

3.1 Introduction

All industries have their unique structure and elements that make identification of service products and their price collection a challenging task.

The purpose of this chapter is to outline a practical way to start compiling the industry-specific indices – generally aimed at the 4 digit industry level. Box 8 shows the main phases that should be accomplished when developing a price index for a service industry. These steps are then discussed in more detail in the remainder of this chapter.

Box 8. Main phases of the development process

A. Drafting an industry description

B. Internal discussions in national statistical institute

C. Meetings with the trade organisations that are working in the field

D. Methodological aspects (not in chronological order)

a. Contacting enterprises

b. Forming the sample frame

c. Service product identification

d. Pricing methods to be proposed to enterprises

e. Weighting structure

f. Index formula

E. Pilot survey

1. Selecting the pilot enterprises-Choosing the sampling method and selecting the sample-Investigating the weights structure for all levels

2. Drafting the questionnaires, instructions and selecting the pricing methods

3. Compiling indices

4. Quality assessment

5. Return to trade organisations

F. Sample design of full scale survey and derivation of index weights

G. Continuous data collection

H.Index calculation and quality checks

The process described here is presented in a linear form, even if some phases could be repeated in some other order or interactively. For example, the phases from to A to E are deeply linked and could have been presented in a different order.

It should be emphasised that effective contact with trade organisations can have a great impact on the quality of the whole process[43]. Whilst the national statistical institute is sometimes able to obtain a detailed view of the industry before meeting the trade organisations, feedback from these organisations is important at many stages for the development of a high quality price index for the relevant service industry. The entire process of establishing an index (and relevant sub-indices) for an industry is quite long. Generally, the

[43] In some countries and/or in some industries, information from trade organisations is disseminated more widely than in others

national statistical institutes should not expect less than 2 years from the beginning of the process to the publication of an index. (See also Appendix 1 of this chapter).

Further, price compilers must continue to observe and maintain sample prices after the development process. Details on index maintenance procedures are covered in section 3.9.

3.2 Industry description

The first step in developing a new service industry index[44] is to undertake a detailed analysis of the industry. This pre-study may have different forms but at a minimum it should include the following information:

1. Identification of organisations and trade associations working in this service industry;
2. Detailed review of any previous structural surveys undertaken on the industry by the national statistical institute;
3. Scope of the service industry. What does this service industry include?
4. Brief description of main service products provided by this industry;
5. Description where service outputs are used (e.g. extracted from supply and use tables);
6. Price determining factors for service products within the industry;
7. Possible sources of turnover data at service product and enterprise level (if additional to Structural Business Statistics);
8. Distribution of turnover between different service products;
9. Overview methods used in other countries.

This pre-study can then be used as the starting point to consider which pricing methods could be employed. It should also provide initial information on how to divide the service products into main groups and how these groups could be weighted together to obtain the total aggregate of this service industry.[45]

3.3 Contacts with trade organisations

It is useful to establish at the beginning of the developing process connections with trade organisations and other associations that are working in this industry. First of all, the associations or organisations may be able to help statisticians to get a better understanding of the industry by providing an overview of possible service product groups and activity fields and likely problems to be faced in the compilation of SPPI. They may also provide help in drafting service specifications and in forming a more detailed sampling frame. The trade organisations often have good relationships with enterprises. They may help in motivating enterprises to participate in the work and assist in finding the right contact persons in individual enterprises.

3.4 Methodological aspects

3.4.1 Sampling frame

The situation concerning possible sampling frames may vary a lot from country to country. In many countries the business register or national accounts provide one possible source of sampling frames. Business registers normally have information on turnover, number of employees and the main industry, but they usually lack information about the establishments or turnover information by service categories. Sometimes an additional survey is needed to derive reliable weights for enterprises or the main service product groups for the industry. The trade organisations, regulatory authorities or market studies carried out by third parties may give additional information. In extreme cases the frame might be structured on the basis of additional information obtained from the telephone directory or the internet.

[44] Note that "industry" means here that service products are aggregated to the 4-digit industrial classification. In practice the index usually only covers service products principal to the industry, but in concept should also include secondary production.

[45] Examples of the industrial description can be found in the website of statistics Sweden: http://www.scb.se/templates/Standard____29560.asp

3.4.2 Service identification

For each group of services (for example CPA classification of service or the more detailed service heading that has been identified during the planning) a set of specific representative service products need to be fully specified for pricing. These service products should be representative for their service product group and have price movements typical of the range of individual services within the service group under consideration. These service specifications may often be slightly different for each individual service product within each sampled enterprise.

The purpose of a good service specification is to ensure that a consistent price is collected from period to period, relating to a consistent service with the same terms of sale in each period. The following table lists some of the criteria that could affect the price of a service and could form part of a specification. Obviously the list is not comprehensive and additional criteria may be required in different service industries or enterprises[46].

[46] Examples of the product specifications that have been used in different industries can be found in Chapter 4. See also the PPI manual, Chapter 10, where compilation of SPPI for some services is discussed.

Box 9. Service specification	
Specification	*Short explanation*
Name of service	Enterprise's name for the service within the specific service group. For example day-to-day bookkeeping.
ID number	If the enterprise has the ID number for the specific service, that can be used. However in many cases this may not exist.
Description /Coverage of the service	The enterprise should specify what the service includes in as much detail as possible. For example list of individual tasks included. In bookkeeping for instance. The day-to-day bookkeeping includes at most 50 entries a month.
Unit of sale	Units used in describing the service (for example minutes, hours, entries, documents or tasks)
Customer	Pricing structure might depend on customer (or the size category of the customer). A reference number can be used to maintain customer confidentiality.
Discounts	All applicable discounts should be described
Location	The price of the service may depend on the place where it's supplied
Payment terms	The different payment or credit terms may have different prices.

3.5 Pilot survey

The pilot survey is the vital part of the development process. Different pricing methods can be tested in practice and then the most suitable selected. The test survey can also provide additional information about the price variability between the enterprises and so provide valuable information on the sample size required (i.e. the greater the variation the larger the sample size required). During the test survey the product identification and questionnaire should be improved in co-operation with the enterprises. After the pilot survey has been carried out successfully and it is confirmed that the questionnaires and the pricing methods are plausible then the survey can be extended.

Ideally the sampling unit is the establishment/KAU, but in practice an enterprise is often used. The selection of enterprises in the pilot survey should be performed using the same method planned for the production survey. It is common that service price indices are developed industry by industry. This allows a different sampling strategy to be used in different industries, which may also depend to some extent on the quality of the frame available for the industry.

Due to a lack of survey design information, it can be difficult to determine an appropriate sample size using statistical procedures[47]. Sample size may be determined by using some fixed, expected coverage rate or by taking the decision on the basis of the resources available for the survey. The sample size in the pilot study is normally smaller than in the production phase. A more detailed description of different sampling methods and stratification criteria can be found in the PPI Manual, Chapter 5.

To ensure a successful pilot study it is important to be first acquainted with accounting practices of the industry. After that, the questionnaire and instructions can be drafted. In many cases the international service classifications are not detailed enough to specify a unique service product that can be re-priced from period to period. These international classifications (for example CPA) are mainly referring to certain families of services that belong to this wider group because they have common end-use or are

[47] This refers to standard sampling techniques, which generally require detailed information on the variation of the variable of interest. This is generally not available in the case of price variation for service product groups.

considered to be close substitutes. Information from industrial descriptions and trade organisations can be used to complete the classification information to form more detailed service headings that all belong to the same family of services.

Depending on resources the enterprises may first be contacted by personal visits, or by phone or mail (post or e-mail). When the right contact person has been found inside the enterprise it is very important to have detailed discussion with her/him on the purpose of the index. The services that are going to be priced and their detailed specifications are decided in co-operation with the enterprises[48].

3.6 Treatment of quality change

3.6.1 Preparatory work for handling quality changes in service products

Services are more difficult to specify than goods and, consequently, changes in the quality of services are often difficult to identify. A general rule is that there is a case for quality adjustments if a client is willing to pay more/less for a changed service. This rule is not easy to follow particularly because services are often partly or fully unique. Moreover, changes in service characteristics might take very different forms and they are not necessarily systematically either improvements or deteriorations. As a result, some subjectivity cannot be avoided when deciding when a quality adjustment should be made.

The need for quality adjustments and replacement of pricing specifications is encountered continuously in the index compilation. Therefore, preparedness for changes in the market and service products should be enhanced and maintained as far as possible. It is important to discuss with price collectors on procedures of how to handle quality changes in service products. Preferably, guidelines on this can be provided at the same time as sample price specifications are discussed. Particularly the following subjects need to be addressed in discussions with the price collectors and enterprises:

1. expected changes in the representativeness of services over time;
2. expected changes in the quality of services;
3. quality adjustment methods to be considered, and
4. data availability for implementing quality adjustments.

Possibilities to predict all changes are, of course, quite limited in practice but efforts should still be made. Advance preparations can better ensure that required replacement of pricing specifications and associated quality adjustments can be carried out quickly when necessary.

3.6.2 Examples of quality adjustment methods

In principle, the same quality adjustment methods can be used for services as for goods. In practice, fewer possibilities are available for services and also the usability of various methods differs between goods and services. This is illustrated in Box 10 that compares the use of quality adjustment methods for goods vis-à-vis services in Japan. The table shows that for only one third of services a quality adjustment method could be found whereas for more than half of goods an adjustment could be made.

The following text describes some examples on the use of quality adjustment methods for services. The examples are based on experiences in Japan[49] where methods used for SPPIs are:

- Overlap method,
- Comparable replacement,
- Quantity adjustment,

[48] Ideally, the selection of services would be undertaken from a complete census of the relevant transactions. Obviously, in most cases this information is not available.

[49] See the following papers, Moriya K., Utsunomiya K., Quality adjustment in practice: Case studies in the Corporate Service Price Index (CSPI), the 18th Voorburg Group Meeting, Tokyo, 2003 paper; Hirakata N., Kouju A., Utsunomiya K., Quality adjustment method in prepackaged software in Japan's 2000 base Corporate Service Price Index, the 19th Voorburg Group Meeting, Ottawa, 2004 paper, Ugai H., Quality adjustment of service prices, November 2001, Bank of Japan

- Differences in production and option costs,
- Hedonic approach.

Each method has both advantages and disadvantages. The choice between various methods depends on service characteristics and data availability.[50]

Box 10: Use of various quality adjustment methods in corporate price indices in Japan, 2003

	Services		Goods	
	Number of cases	(%)	Number of cases	(%)
Production cost	65	9.1	269	17.3
Overlap	30	4.2	49	3.2
Hedonic regression	2	0.3	52	3.4
Direct comparison	125	17.5	428	27.6
Unit price	0	0.0	20	1.3
Impossible to compare	489	68.5	727	46.8
Others	3	0.4	7	0.5
Total	714	100	1 552	100

Overlap method[51]

The overlap method can be used when old and new products are transacted simultaneously during a certain period of time and thus it is possible to use observations in the overlapping period as a link. An implicit assumption in the method is that the price difference between the old and new products reflects entirely differences in quality.

A major problem in this method can be that the old product is at the end of its lifespan and the new one is entering the market and, consequently, the market is not necessarily in equilibrium. This situation is encountered particularly if the service products concerned are under strong technological development and, as a result, old services rapidly lose their attraction while new ones gain ground. Also in the case of slower progressing service products, a similar instability of the market might be a result if aggressive price competition is used as course of action to penetrate the market. The assumption that differences in prices reflect entirely differences in quality does not hold in these cases.

Box 11: Outdoor advertising

For "outdoor advertising", an advertisement is specified based on size and location. If one of advertisements expires, the sample price is replaced for another. In this case the overlap method is often used providing that the new sample price has coexisted with the old one and the price difference between them has been relatively stable in the past.

Comparable replacement

When no quality difference exists between old and new service products, the direct comparison method – which incorporates the prices of new service products into the index by comparing them directly with those of old services – can be used. A typical example of these cases is when the name of a service product has changed but not the service itself, or cases in which the reporting enterprise has changed due to affiliations but transacted services and transaction conditions have remained the same.

Box 12: Domestic air passenger transportation

Air tickets might be sold during a limited time (e.g. in the holiday season) at discount or by different names. If the quality of services, cancellation rights and terms of payments etc. are largely unchanged, comparable replacement is a sound method to be applied in these cases.

Quantity adjustment

Quantity adjustments are used in cases where the specification of service products is based on a given standard that slightly changes from the previous period. To be applicable, it is also important that fixed costs of service provision are

[50] Discussion on various adjustment methods and their suitability in different situations can also be found also in Chapter 11 of the *OECD Handbook on hedonic indexes and quality adjustments in price indexes: special application to information technology products.* (Handbook)

[51] Detailed discussion of the overlap method can be found in the PPI Manual, Chapter 7, par. 7.80-89

relatively small. In these cases prices can sometimes be expressed as unit prices which make it possible to establish price comparison between periods. Examples of these kinds of services are taxi transportation and newspaper advertising where prices are established based on given standards. The method should, however, be applied with caution and only if changes in standards are relatively modest.

Box 13: Newspaper advertising

In newspaper advertising, the size of standard advertisement is increased from 36.85 to 44.28 square centimeters (from 5.5 x 6.7 to 5.4 x 8.2 centimeters), and the price increases from 903.2 yen for the old sample to 1 085.5 yen for the new sample. No price change is shown, because the unit price remains unchanged (24.51 yen per square centimeter).

Differences in production and option costs

The production/option cost method is typically used in a situation where an old service product is replaced by a new one and there is no overlapping period where a representative set of prices are available for both services at the same time. In the method, the quality difference between the old and new products is measured based on the assumption that changes in production costs reflect directly the quality difference between the old and replacement service products. An advantage of the method is that as long as data can be obtained from surveyed enterprises, the information can be incorporated easily. The index compiler has to constantly exchange information with enterprises to judge to what extent changes in production costs really correspond to changes in quality.

Box 14: Building cleaning service

The frequency of cleaning services is increased. Correspondingly, actual prices change from 1 000 euros in the old sample to 1 100 euro in the new one. The enterprise reports that the price of the additional cleaning is 130 euros.

An appropriate price index is:

$$I_t = 100 \times \frac{p_t}{\frac{p_t}{p_t - a_t} \times p_{t-1}}$$

$$= 100 \times \frac{p_t - a_t}{p_{t-1}}$$

$$= 100 \times \frac{1100 - 130}{1000}$$

$$= 97$$

where:

p_t is price in t

a_t is price of increased cleaning

The formula is the same when the amount of services decreases but the sign of a_t is negative in this case.

The method is applicable for services that undergo simple changes rather than change in terms of contents. It is particularly convenient in a situation where only the specified amount of service changes. Thus, the method is often used in situations where also the quantity method might be applicable. For example, it could be considered for cleaning services in cases when the area to be cleaned and/or the frequency of cleaning change.

Hedonic approach

The hedonic approach is used for products that are under rapid development and where sufficiently representative and robust prices cannot be found to cover overlapping periods. Instead of relying directly on prices of new and old products, a price comparison is established on the basis of the characteristics of products.

In market equilibrium and perfect competition, prices are supposed to reflect the importance of various characteristics of products. This makes it possible to use actual data for identifying price determining factors and for establishing a

regression model. The model can then be used for estimating an overall quality change of products whose characteristics change over time.

For services, price determining factors are difficult to identify or to measure, and therefore the hedonic method is rarely directly applicable. However, it might be used indirectly, namely, in cases when services are related to goods of which price changes are estimated using the hedonic approach. An example is the rental of machinery like computers, whose price index might be based on a hedonic regression model.

Box 15: Computer rental

The rental of a notebook computer for six months costs 26 700 yen and increases to 38 900 yen. In the old sample, the memory size of the computer was 374MB and the clock frequency 1.0GHZ while in the new sample these characteristics changed to 768MB and 1.6GHz. A hedonic regression model showed that the quality of the computer improved by 48.7 per cent.

The old sample price is adjusted to make it comparable with the new sample price: 1.487*26 700 yen =39 703 yen. Thus, the price decreased by 2 per cent (change of prices from 39 703 yen to 38 900 yen).

3.7 Index calculation

3.7.1 Index formula

The index formula chosen for the elementary aggregates[52] can vary as a function of the sampling method, information available, specific nature of industry and resource restrictions. A more extensive description of widely used elementary aggregate formulas and their justification can be found in the PPI Manual, Chapter 20. When aggregating sample price relatives[53] within elementary aggregates, in many cases the geometric average may be recommended as the best micro index formula particularly when information on weights is not available. An advantage of using geometric averaging is also that outliers have less influence on results. However weights may often be required for price relatives due to the sampling methodology used (see 3.7.2)

The index number formula used in the aggregation of elementary aggregates should be selected as a function of the indicator's purpose. Individual countries may have different priorities and the formulas may therefore differ from country to country. It is recommended that the EU member states should use a Laspeyres-type index formula that is in line with the EU STS regulation.

3.7.2 Weights and aggregation of an index

As discussed in sections 1.3 and 1.9, there are two common methods for aggregating data collected from enterprises to form a particular SPPI, usually at the 4-digit industry level. By strict definition, in the product SPPI the aggregation is based on service products provided by any industry either as principal or secondary production, and in the industry SPPI establishments/LKAUs (in practice often enterprises) are used first to compile a price index for the unit which are then aggregated to cover the whole service industry. Note that in both these cases the weights given to particular production units (i.e. establishments/LKAUs, enterprises) should reflect the inverse of their probability of selection, or at least be such that the weight of a selected production unit takes into account other similar production units it represents in the index. These weights are generally regarded as first stage weights. Second stage weights refer to the size of the production unit (e.g. total employment or preferably total turnover).

1) Product SPPI: aggregation through elementary aggregates or a 'family tree' of service products

If a product classification can be determined within a service industry, then this classification can be used to form an elementary aggregate or 'family tree' structure for an industry. The produced classification might originate from an existing classification (rare) or through a specific survey that has been undertaken (more common) or through advice from an industry association. Each of these elementary aggregate components is weighted according to the estimated proportion of production for these products within the industry. Using this approach, surveyed businesses will contribute one or more sample price relatives[54] to the elementary aggregate structure[55]. The weight of a sample price relative will be equal to the production units' first stage weight multiplied by

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[52] An elementary aggregate is generally the lowest level within an index structure (i.e family tree) for which reliable weights exist for the population of interest (e g relatively homogeneous group of service products), generally obtained from some source not directly related to the collection of prices (e g independent survey). Samples of prices are collected within each elementary aggregate

[53] Sampled price relatives are the micro indices of sampled prices contributing to the elementary aggregate

[54] In this context, following from the previous footnote, a price relative refers to a service product surveyed within the enterprise for which a micro index has been estimated This micro index could have been made up of one or several price quotations for similar service products provided by the enterprise In the case of several service products contributing to the micro level index, equal weights would generally be used in forming the micro level index at the firm level unless the firm had very detailed information available to allow different percentage weights to be used at this micro index level.

[55] Note, a business will only contribute a specification to a component of the elementary aggregate structure if it has significant production for the particular service product in question Thus one does not expect a business to contribute specifications to each component of the indices' elementary aggregate structure

a proportion of its second stage weight. This proportion should equal the estimated proportion of its total production on service products within the elementary aggregate component that the sample price relative is contributing to. See Box 16 below as an example of this weighting methodology.

An advantage of this form of index aggregation is that sub-indices for service products (i.e. which form the elementary aggregate structure) are produced which may be a useful output if deemed to be of suitable quality. A potential disadvantage of this method is that it relies on the relevance of the product classification forming the family tree structure. If this phase of the index development has not been done well then the family tree structure may not represent important product groups within the industry and the index could be of low quality.

2) Industry SPPI: aggregation of firm level indices

Another possibility is to first form specific indices for each production unit (e.g. establishment) in the survey. These specific price indices are then aggregated together to form the service industry index, where the relevant weights are the multiplication of the enterprises' first and second stage weights as described above. The advantage of this method is that the production units can use their own familiar service classification, so that the potential classification bias can be reduced. Within a production unit, sample price relatives may or may not be weighted depending on the diversity and relative production values of the different service products produced by the unit.

As pointed out in section 1.3, product SPPI can in general be regarded as preferable. A drawback of industry SPPI is that the production unit may produce services that are officially classified for some other industry than the one that is their main activity. However this could possibly be corrected to arrive at product SPPI by moving certain price relatives to contribute to the aggregation of the appropriate 4-digit industry. Another serious shortcoming of industry SPPI is that the method is unable to provide information about price development of individual services (e.g. as provided through the elementary aggregate structure described in method 1 above). This is especially problematic if the service industry in question includes a large number of different service groups.

Box 16. Weighting example for product SPPI of 4-digit level industry xxxx

An industry survey showed that the industry xxxx produces 4 main product groups y1, y2, y3 and y4 with approximate shares 20%, 30%, 15% and 35%. This defines the elementary aggregate structure for the SPPI.

5 establishments are chosen in the sample for industry xxxx using PPS sampling[56]. They have the following characteristics:

Establishment	Probability selection	Turnover	Shares of y1, y2, y3 and y4 on turnover, %	Price quotations within product groups taken for each establishment
A	1/5	100	(0.25, 0.25, 0.5, 0)	(1, 2, 3, 0)
B	1/8	70	(0.7, 0, 0, 0.3)	(4, 0, 0, 2)
C	1/10	40	(0, 0.4, 0, 0.6)	(0, 3, 0, 3)
D	1/50	10	(0, 0.5, 0.5, 0)	(0, 3, 3, 0)
E	1/100	4	(0, 0, 0, 1)	(0, 0, 0, 4)

For each establishment, price quotations (specifications) within a product group have equal weights. Price relative for each specifications are aggregated geometrically to form an enterprise level price relative for the product group. These price relatives (micro indices) must then be weighted together with other enterprises' price relatives to form the elementary aggregate (i.e. product group) indices.

	Establishment	1st stage weight[57]	2nd stage weight	Total weight (1st x 2nd)	Elementary index weight for enterprise price relative
Product group y1	A	5	100 x 0.25 = 25	125	125/(125+392) = 0.24
	B	8	70 x 0.7 = 49	392	0.76
Product group y2	A	5	100 x 0.25 = 25	125	0.23
	C	10	40 x 0.4 = 16	160	0.30
	D	50	10 x 0.5 = 5	250	0.47
Product group y3	A	5	100 x 0.5 = 50	250	0.5
	D	50	10 x 0.5 = 5	250	0.5
Product group y4	B	8	70 x 0.3 = 21	168	0.21
	C	10	40 x 0.6 = 24	240	0.30
	E	100	4 x 1 = 4	400	0.49

Having produced SPPI at a 4-digit industry classification, there may be a desire to aggregate these to higher levels (e.g. ISIC division level) to form macro level indicators, which may be of particular interest to central banks or treasuries monitoring inflationary pressures. The most appropriate source of weights for combining 4-digit industry level indices to higher aggregates within the industry classification would be industry based statistics on value added from the national accounts (often input-output tables).

[56] Probability proportional to size (PPS) sampling is recommended in the PPI Manual, see Chapter 5, pages 113-114, of this manual for a worked example. In simple terms, the probability of an establishment being selected in the sample is proportional to a measure of size for the establishment obtained from the sampling frame (e.g. turnover). Consequently, the larger the measure of size of the establishment is, the higher the probability that it will be included in the sample.

[57] The first stage weight for an establishment is equal to the inverse of its probability of selection.

3.8 Quality assessment

Quality assessment is extremely important when a new pilot study has commenced, and should also be performed periodically after the establishment of the index. The quality assessment procedure is discussed below from two points of view, first an assessment of the SPPI per se and then from the point of view of national accounts. The assessment procedures are based on experiences in the Netherlands and Switzerland.

Assessment of SPPI (Netherlands)

Box 17 below lists the evaluation criteria currently used in the Netherlands to choose one method from a number of methods tried out in a pilot survey.

Box 17. Assessment of different pricing methods in the Netherlands performed at the end of the pilot phase to evaluate the potential pricing methods and choose the best option.

- Ability to approximate transaction prices,
- Objectivity (for example, a charge out rate is more objective than re-pricing a project, because re-pricing can be dependent on the person who estimates the price),
- Pricing frequency,
- Continuity (How long can this pricing method be applied without a change),
- Practicality for the staff of the statistical office. It is a severe drawback if a method is too difficult and takes a long time to implement or is expensive to maintain,
- Response burden (measured in the time that a respondent needs to fill in the survey),
- The response rate (the ratio of returned survey forms to the number of forms sent out),
- Transparency of the method,
- Plausibility of the results,
- The opinion of the pilot-study respondents about the methodology.

The criteria matrix is formed from these criteria. Each aspect is given a score (for example very positive (++), positive (+), neutral (0), negative (-), very negative (--)). The criteria are also weighted (high (A) or low (B)). This is somewhat subjective and depends on the person who fills in the matrix, yet it provides an easy way to compare the methods with each other. An example of criteria matrix is shown in Appendix 2 of this chapter.

Assessment of SPPIs from the point of view of national accounts (Switzerland)

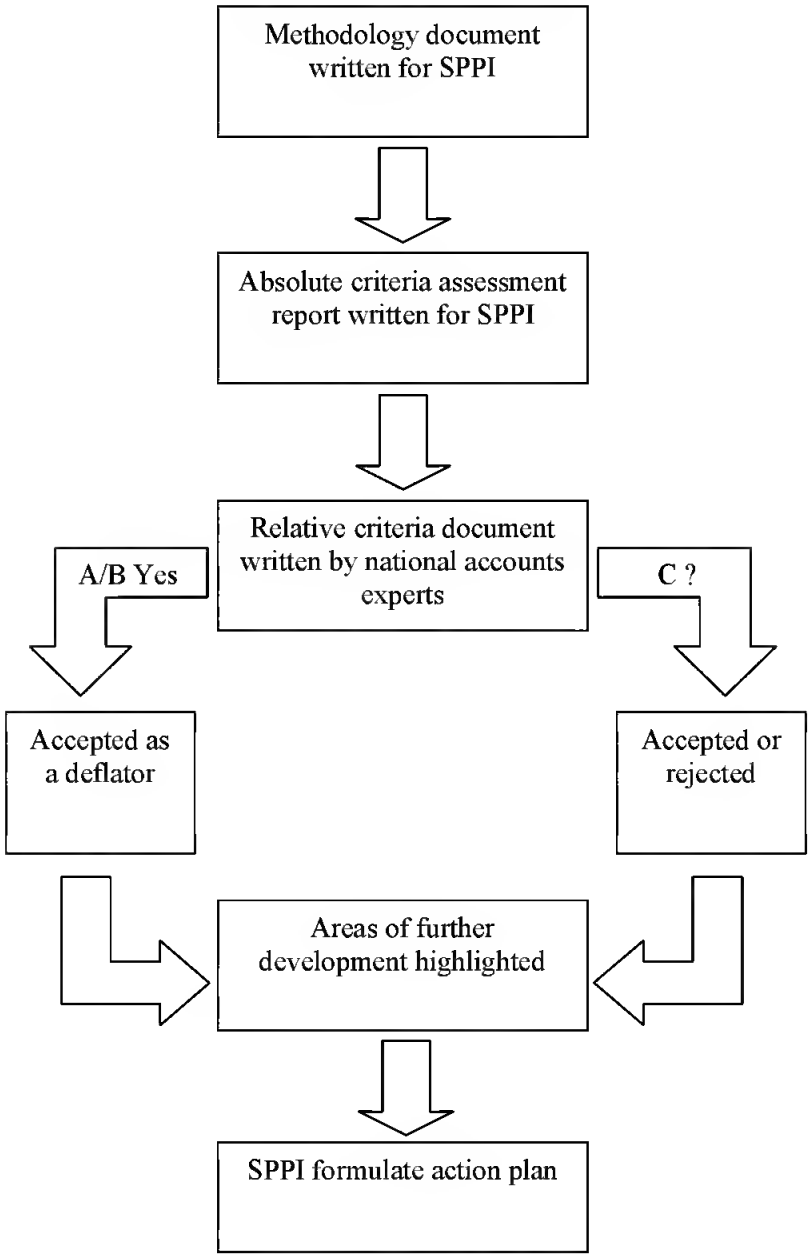
Another way of assessing SPPIs is to consider their quality as a national accounts deflator. The criteria that are used in the evaluation can be divided into two groups: absolute measures that indicate how reliable the SPPI are in their own right, and relative measures that compare the SPPI to deflators that are used currently. Only the absolute measures are discussed here.

Box 18. Assessment of SPPI in Switzerland. The criteria used:

- Statistical properties of the survey,
- The definitions and specifications of the variables (should be in line with the national accounts definitions specifications),
- Periodicity of data collection, timeliness and length of the series,
- Quality checks (ability to explain erratic movements) and periodicity of index revisions,
- The transparency and available documentation of the production and quality assessments.

The relative criteria assessment is done by national accounts experts who will classify the method used into an A, B or C method according to classification proposed in Eurostat's handbook on price and volume measure in National Accounts. A more extensive treatment of the quality assessment criteria of SPPI for deflation can be found in the Eurostat handbook. A flow chart of the quality assessment process is shown below:

Figure 2. Flow chart of quality assessment project



After the quality assessment has been carried out properly and the necessary actions have been taken to improve the survey, full-scale data collection can be started. The extension of the survey proceeds in similar manner to the pilot survey.

3.9 Maintaining the quality of service prices

Maintenance of service price quality is an unavoidable task in the compilation of price indices. Ideally, prices for a representative set of service products could be surveyed from one period to another but in practice the market changes continuously. New services appear replacing old ones. For example, in the telecommunication sector the new opportunities of UMTS technology may provide new service products that are swiftly adopted by enterprises. Sometimes services as such remain unchanged but the pricing mechanism might change and, consequently, pricing methods have to be changed. Also the business demography might be changing which might influence needs to revise the sample frame. For all these reasons, maintaining representativeness of the sample and at the same time capturing pure price changes in the survey data for an SPPI is a challenging task.

The maintenance work of service prices thus includes 1) evaluation of the representativeness of service products in the sample, 2) continuous observation of sample price specifications, 3) replacements of sample prices. Use of representative products in an SPPI is an essential precondition for monitoring correctly the evolution of prices. Confirmation of sample price specifications is of the utmost importance in ensuring that the prices of the same products are followed over time. When sample prices are replaced, quality adjustments should be made when necessary.

The maintenance work has to be done after the periodical price survey starts and within the cycle of the survey period. To enable the maintenance work to be performed timely, accurately, and efficiently, the price compilers need to be prepared in advance. They have to reserve time for discussions with respondents and possibly industry associations on changes in the market and possible solutions. Proper preparation for surveys is in general time consuming, and it is possible that not enough time is available for all maintenance tasks during the survey periods. Therefore, focusing on maintenance work outside the current periodical surveys (e.g. half-annually or annually) is a practice worth considering.

Further information on the maintenance of a price index can found particularly in Chapter 8 of the PPI Manual.

Appendix 1: Stages in the development of SPPI - an example

Stages in the development of SPPI for business, management and consultancy activities (74.14 NACE) in France (the index will be finalised in 2005 with base year 2004)	
Year 2003	
January-February	Preliminary study of the sector : INSEE figures, web sites, trade organisation figures
February	Meeting with the trade organisation to present the project of this new index
May	Second meeting with the trade organisation on the consulting management index only
June 18th to July 8th	Four test-visits into companies: Accenture and Cap-Gemini, for example. Two big companies, two intermediate companies and one small company have been selected with the trade organisation. One visit was too late for the test.
July 24th	Internal meeting on the different methods. The best practice recommended for this sector was average price by skill-level of employees (qualification).
August	Sample chosen For the product parts: Systematic sampling for the largest companies based on the annual statistics for services survey as a frame. Random sampling by stratum (turnover*product) below a threshold. For the consultancy part: judgemental sample because of the bad frame quality.
September	Beginning of the field officers visits.
Oct-Dec	Price collection began/Field officers' visits continue.
Year 2004	
May to September	Examination of the "difficult cases" in order to obtain a complete sample, with prices back to the 2nd quarter 2003
September	Meeting with the trade organisation to show results
Year 2005	
First or second quarter	Public dissemination of the index

Appendix 2: Example on a criteria matrix for legal services

	Weight	**Model prices**	**Realised turnover per hour**	**Charge-out rates**
Approximation transaction prices	A	+	0	– –
Objectivity	A	–	+	+ +
Frequency of measuring	A	–	+ +	–
How long does the method stand?	B	+	+	+
Practicability to take into production	B	+	+	+
Ease to explain	B	+	+	++
Response rate	A	–	+	+ +
Plausibility	A	–	+	+
Respondent burden	A	+	+	+ +
Opinion respondents	B	+	+ +	+

4. Compilation of SPPI for specific service industries

4.1 Introduction

This chapter is based on country practices and deals with feasible solutions to implement SPPI in some specific service industries.

A selection of service industries has been made by the Task Force considering different criteria: the size of industries, the speed of technical change that is likely to affect price measurement, the need from the national accounts to have as soon as possible accurate deflators (i.e. using an A-method instead of other methods) and the economic trend in some service industries for which prices are less regulated nowadays.

An assumption of this chapter is that the view and the practice of one country are similar to those of another country. However, in each service industry, a paragraph is devoted to an overview of national methods.

As a preliminary choice was made to treat first some service industries, this chapter may evolve with time. This guide remains a living manual and will be updated at regular intervals with new inputs on new service industries from countries.

The service industries covered are listed below:

ISIC Rev 3.1	NACE Rev 1	Title	Section	Author country
6023	60.24	Freight transport by road	4.2	UK
611	61.10	Sea and costal water transport	4.3	DEU
621, 622	62.10, 62.20	Air transport	4.4	AUT
6301	63.11	Cargo handling	4.5	NZL
6302	63.12	Storage and warehousing	4.6	NZL
641	64.1	Post and courier services	4.7	ESP
642	64.20	Telecommunications	4.8	UK
701	70.1	Real estate activities with own property	4.9	UK
72	72	Computer and related activities	4.10	SWE
7411	74.11	Legal activities	4.11	DEU
7412	74.12	Accounting, bookkeeping and auditing activities; tax consultancy	4.12	IRL
7413	74.13	Market research and public opinion polling	4.13	UK
7414	74.14	Business and management consultancy activities	4.14	FRA
7421	74.2	Architectural and engineering activities and related technical consultancy (Here the Engineering part only is covered)	4.15	NLD
7422	74.3	Technical testing and analysis	4.16	FIN
743	74.4	Advertising	4.17	US
7491	74.5	Labour recruitment and provision of personnel	4.18	FRA
7492	74.6	Investigation and security activities	4.19	FIN
7493	74.7	Industrial cleaning (The ISIC 7493 corresponds to Building cleaning and industry cleaning activities)	4.20	NLD

The descriptions have the same format. The structure of the presentations is the following:

1. Description of the service industry (4 digit level)

This section gives a general outline:

- How the service industry is **organised** in countries: is the sector concentrated or not? What have been the recent developments for this service industry? What are the uses of the service production?
- What are the price **mechanisms** and price determining factors of services in this industry?

2. Classification aspects and scope of the survey

This section shows in detail the classification used in the country referring to harmonised classification systems as CPC, NACE, ISIC. The discussion is also related to the final uses/users of the service industries output. In some service industries the split of production between business and other (e.g. government, consumer, export) may be difficult to be measure, and this issue is addressed.

3. Sample design

The section describes the sample frame, the stratification criteria, the sampling methods (the most suitable theoretically or/and the most practical one). The section focuses also on any special features of the service industry.

4. Main pricing methods

The section provides a reason and clear recommendations or preferences on the pricing method(s) to be used, taking into account the specificity of the country.

The choice of an adequate pricing method is based mainly on:

- pricing mechanism,
- easy identification of the service specification (e.g. in the business accounting system),
- adequacy in capturing quality changes,
- repeatability of the price specification,
- response burden for businesses,
- resources in the NSO,
- timeliness of the data collection.

5. Costs and benefits of the alternative pricing methods

This section may describe the advantages and disadvantages of the alternative pricing methods compared with the main pricing method(s) of section 4.

6. Quality issues

The section provides information on the quality determining characteristics of services in this industry and how quality changes are dealt with. As the general principles are covered in chapter 3, this section may describe how quality adjustments are made in practice for specific services.

7. Collection of information and specification of the services

This section covers two topics: how the data collection is organized and the common types of price specifications for the service products in the particular industry.

The collection of information may include:

- description of the survey,
- different ways of collecting data (mail, field officer, web-based etc.),
- different treatments due to the business' size or due to the collection' frequency if any,
- description of the contact person in the enterprise,
- etc.

The specification of the service to be quoted by the businesses is a very important issue. An adequate and accurate service product specification may secure the process of comparability over time and of quality treatment. In each service industry, this section should describe in detail the characteristics of the service to be quoted. The specification may be illustrated by a survey form.

8. Specific aspects

This section may include the aspects of:

- export price indices,
- sub-contracting,
- indices maintenance (e.g. weighting system),

- future developments of the service industry,
- etc.

9. Overview of national methods

This section describes what services are covered in SPPIs in various countries and which pricing methods are used. Any other methodological issues can be mentioned here in the light of national experiments.

4.2 Freight transport by road

1. Description of the sector (ISIC 6023 / NACE 60.24)

Freight transport by road is the largest component of the freight transport industry. Traditionally, the industry provides the efficient transportation of a wide variety of goods from source to destination. These include: carriage of agricultural equipment and livestock; general haulage; international haulage; tankers; temperature controlled transport; tipping and construction; and warehousing and distribution. More recently, a significant number of businesses involved in freight transport by road have widened their activity to include transport logistics.

2. Classification aspects and scope of the survey

Traditionally, activities of businesses engaged in road haulage were focused on simply providing the physical means of transporting goods from point A to point B, with a small minority having an ancillary, but less important, interest in providing storage and warehousing facilities for goods in transit. As a result, the task of isolating and collecting data for the total activity of contracted road freight services has been relatively straightforward with the vast majority of businesses being classified to ISIC v3.1 6023 (CPC v1.1 6433, 6434 and 6435). However, in recent years, the industry structure has changed and it is now a more complicated process to ensure that prices data are truly representative of the entire road freight industry.

Although the volume of road freight business has remained buoyant in recent times, competition in the industry has increased and, in some sectors, the market is showing signs of saturation. Many of the largest businesses have opted to concentrate on specialist niche markets or destinations (such as those serving international destinations) and have also diversified, to offer clients a wider range of specialist, transport-related services. Indeed, many enterprises now describe their activity as the provision of freight logistics, designing and implementing supply chain management. This can often cover the movement of people, services and information, as well as goods. In these cases, the actual transport of goods may no longer be the primary activity as logistics businesses can offer clients a complete and over-arching range of freight-related services, tailored to suit the needs of each specific client. These services may include some or all of the following:

- Freight forwarding,
- Cargo consolidation, management and handling,
- Stock control and re-ordering,
- Dealing with documentation,
- Storage and warehousing,
- Information management services, e.g. operating web sites linking loads to haulers and the increased use of Electronic Data Interchange (EDI),
- Courier services,
- Negotiating return loads for clients' own transport,
- Transport consultancy services.

Some have gone even further and moved upstream into the specialised fields of packaging, crating, palletising and containerisation of goods, and even into the fields of plant-hire, vehicle-recovery, repair and maintenance. In addition, increased access to, and use of, the internet has led to the establishment of global partnership networks, linking international logistics businesses, haulers, shipping and railroad operators. These partnerships can arrange and undertake all freight services for goods destined for any part of the world under a single, integrated contract.

Such diversification and increased sophistication has tended to leave the smaller independent operators behind in terms of development of their

business activities. These operators are essentially now left dealing with regular contractual work for a limited number of clients, serving a specialised market, bidding for spot-contract or one-off loads, or concentrating on distribution within a defined geographical region

The product classification of the road freight industry may be appropriately partitioned into the type of goods being transported (e.g. liquid, livestock, refrigerated etc). Where operating costs (such as fuel costs) differ across international boundaries, it is recommended that international road freight be assigned as a separate product group within the industry, to maintain homogeneity in product groups. It is also recommended that the ISIC and CPC classifications are used as a preliminary and adequate basis for road freight. National deviations from these product activities should be recognised and included in the national SPPI.

3. Sample Design

As a first approach, it is recommended that probability proportional to size (PPS) sampling is adopted. Options for stratified sampling, using employment or turnover as the stratification variable, may be applied to improve efficiency of the sample through reducing variance. Where there are regional variations in price movements, consideration should be given to stratification by region. If national road freight is recognised to be dominated by a small number of large businesses, a mixture of purposive and random sampling may be considered. This would ensure that the leading businesses are always included in the sample, with the remaining businesses sampled randomly.

4. Main pricing methods

Within the road freight industry, larger businesses tend to earn revenue from repeated contract work from established customers, while smaller businesses tend to operate on an ad-hoc, single contract basis.

In line with SNA 93, the basic price (the per unit revenue received by the service producer) is the recommended price for road freight service provision. This should discount taxes but include subsidies and discounts. To achieve this, transaction prices are favoured, where possible, in preference to list prices. The specification of the service in road freight requires significant detail to ensure a repeatable service and recognised customer are defined. Ideally both domestic and export activity should be captured during price collection, although many countries just collect the domestic component of intermediate service provision.

The road freight industry offers a complex variety of pricing mechanisms, which may vary depending on cargo-type (liquid, containers etc.), distance (short-haul, long-haul, international) and rate (price per hour, price per kilometre). The prices are often agreed in different frameworks, such as model, spot, transaction/contract, list and tariff. As always, it is important that the SPPI captures the actual price of the service, including any discount.

Contract pricing

Contract pricing is ideally based on transaction prices. Usually they are available for large road freight suppliers and regular customers, who negotiate discounts from the list prices through their guarantee of business volume. The price of these services is measured from actual and specific contracts for the movement of goods, both domestically and internationally. The SPPI survey contributors are asked to supply services and prices which they consider to be typical and representative of their business and, importantly, should be based on repeating contracts wherever possible. It is recognised that there is a potential weakness in this pricing method, as a large element of the overall market may not be fully represented, namely the one-off or spot market, where the service relates to a single journey which is unlikely to be repeated.

List prices might also be available to be used for a SPPI. A list price is the published price for services (usually published as rates applied, based on mileage, weight, volume and additional services) and is often used as a starting point to negotiate discounts for a spot price or transaction/contractual price. However, it does not capture the actual transaction price unless the discounts are known. List price collection may therefore not entirely capture the pressures of the market environment.

Model pricing

This method collects the fictitious price of specified road freight journeys. The trips are priced in the base period and all subsequent collection periods. If a model journey is no longer

considered to be representative of the typical journeys of the business, an alternative journey is usually selected by the respondent.

5. Costs and benefits of the alternative pricing methods

Contract transaction pricing places the least compliance burden on the survey respondent since they are relatively easy to retrieve from respondents' accounting/financial systems. However, contract pricing is only really suitable for large road freight businesses which undertake repeated and long term contractual transport for customers. Use of transaction prices is not suitable for smaller company respondents, who compete for individual journey contracts. The transaction price is sensitive to the volume of business that a customer can offer and this should be defined in the service-product specification, and is essential when using the model pricing approach.

List price collection is most appropriate for smaller road freight businesses and offers a small compliance burden. However, it must be recognised that list prices will not fully track the price movements arising from increased competition.

In the absence of transaction prices, model pricing offers a suitable compromise. This does however require a significant investment of time from NSI and industry to define a representative set of road freight models. This increases direct costs and compliance burden. There is also a danger, with time, that road freight journeys become outdated, which necessitates periodic monitoring of models.

6. Quality issues

Within the road freight industry, there are components of service quality such as timeliness, which are typically fixed and included in the service specifications. When a service is no longer representative of the activity of the business, an alternative replacement should be sought. The alternative service should be as close to the original as possible.

7. Collection of the information

In collecting prices, it is important that the products are representative of the business. To achieve this, it is important that the priced services are defined and agreed with senior management of the business, from areas such as marketing or accounting. It is important that the specific nature of the journey and customer type is defined. This will allow appropriate discounts to be included. In an ideal situation, the following characteristics of a road freight service should be collected:

- Size and type of vehicle,
- Nature and weight of cargo,
- Distance of journey and/or destination,
- Routing information (distribution or joint cargo),
- Time criteria for delivery, if applicable,
- Availability of return cargo,
- Inclusion of loading services,
- Name and customer-status of the customer,
- Domestic or export category,
- Any other special conditions which might apply to the contract.

However, collection of these attributes could place an unreasonable, and unwelcome, burden on data suppliers to provide that level of detail in every case. Therefore, a more pragmatic approach may be applied which accepts descriptions of freight services which differ from the above, but are in line with the normal business practice of the enterprise. This is subject to the important proviso that the data supplier is able to identify the specific contract and can supply the latest (and correct) price for that service on a regular, repeating basis.

8. Specific aspects

Subcontracting is frequent within the road-freight industry. Output is made up of main contracts that may or may not include sub-contracts and of sub-contracts themselves, and in principle the same approach is required when collecting prices for SPPI purposes. However, for practical reasons, it is often appropriate to exclude the subcontracting component from the price collection.

With increasing freedom to conduct business across borders, the export of services becomes an increasing part of road freight revenue.

Differentials in fuel costs between countries can bias prices and the domestic or export nature of the service should be captured in the definition. Experience in deriving a SPPI for road freight, through consultation with industry and trade associations, has indicated that it may be appropriate to include a product for warehousing and distribution in the road freight SPPI. Whilst this activity is classified under ISIC 63.02, there is widespread recognition that it is often an indistinguishable component of revenue for companies classified to freight transport by road (ISIC 60.24).

Future consideration should be given whether to include the significant road-freight activity of those companies which are classified in other transport-related classifications, such as storage and warehousing. Greater consideration should also be applied to a common method of capturing the single, spot-contracts, which are one-off activities and yet form a very significant part of the road-freight revenue. It is also important to ensure that the impact of productivity changes, e.g. such as those arising from increases in legal vehicle size/weight and more fuel efficient engines, are reflected in the price index provided that the actual service remains, from the client's point of view, unaltered. (Such increases in productivity generally have a downward influence on prices).

9. Overview of national methods

A principle paper on Road freight haulage was prepared by the UK for 2002 Voorburg Group meeting which reviewed the different approaches taken by a number of nations.[58]

In the **UK**, respondents to the SPPI road freight survey are asked to provide details of actual transactions undertaken for real clients (or for regular routes serving a number of clients with similar requirements and cargoes) as a preference. However, the collection recognises the variety of ways in which companies set their prices and a mixture of transaction and list pricing is used. Survey collection is achieved using a fixed panel, with the intention of moving to a rotated sample in the future. In view of the difference in fuel costs between the UK and Europe, the UK publishes separate SPPIs for domestic and international road freight.

In **Australia** transaction pricing is used to measure price movements. The Australian sample is mostly long-haul coverage with an intention to increase the short-haul component. The index has demonstrated relative stability over time.

In the **Netherlands**, a mixture of transaction, list and model prices with a high percentage of international road-freight are collected. The sample is stratified by number of employees. Six types of transport, both international and national, make up twelve lower level aggregates. The road-freight journey is used as the basic unit of the PPI. Transaction price is collected from larger companies, with each respondent providing between one and 20 price quotations.

In the **USA**, a hub and spoke network often sees a cargo carried by a number of different vehicles to balance volume and schedule constraints, thereby minimising costs and time. The PPI is derived from a mix of spot, contract, list and tariff pricing although list and tariff have been recognised to be synonymous. In the USA it is typical to charge for fuel as an additional surcharge.

In **New Zealand** a mix of transaction and list prices are collected.

4.3 Sea and costal water transport

1. Description of the sector (ISIC 611 / NACE 61.10)

Sea freight transport is the main component of interest to compilers of an SPPI for sea and costal water transport and is mainly important for countries with a maritime situation or with large intercontinental trade activity. Some countries such as the UK transport most of their external trade (95% in terms of weight) by water. For the competitiveness of both exporters and importers it is essential that shipping markets are open and offer freight rates that are reasonable and not unnecessarily expensive.

SPPI for sea freight transport may consist of price indices for service imports and exports which complement the indices of foreign trade prices,

[58] UK, USA, Sweden, Netherlands, Australia, New Zealand, Belgium, Mexico, Czech Republic, Japan, Switzerland, Norway, Korea, Finland, Spain, Portugal, Luxembourg and Poland (See paper)

which refer to imports and exports of goods only. However this manual is only concerned with output by domestic service providers which would contribute to both a total domestic output and export service price index. On a macro-level the domestic output (i.e. including export) SPPI for sea freight transport also serves to deflate sea freight revenues in the national accounts.

In the Voorburg meeting 2003 methodological papers on sea freight transport were presented by China (Hong Kong), Germany, Sweden and United Kingdom (See HKG, GER, SWE, UK).

2. Classification aspects and scope of the survey

Sea freight transport is part of NACE 61.10. It comprises coastal (domestic) transport und maritime (continental and intercontinental) transport. It excludes inland water transport via rivers, canals, lakes and other inland waterways.

NACE 61.10 includes:

- transport of passengers or freight over water, whether scheduled or not,
- operation of excursion, cruise or sightseeing boats,
- operation of ferries, water taxis, etc,
- transport of towing or pushing of barges, oil rigs, etc,
- renting of ships and boats with crew.

Transport of passengers, operation of excursion, cruise or sightseeing boats might be economically significant for some countries. The transport of towing or pushing of barges and rental of ships and boats with crew can be considered as economically less significant for most countries. Thus sea freight transport forms the essential part of an SPPI for NACE 61.10.

A significant element of seaborne freight is carried by roll-on-roll-off ferries (albeit normally loaded aboard on road-going vehicles), but this is excluded from consideration in this chapter.

3. Sample design

The design of the survey is mainly dependent on the methodology (line shipping, inclusion/exclusion of tramp shipping) and the number of relevant market competitors in sea freight transport. Sampling rotation is advisable, especially among smaller companies.

Sampling is mainly based on business registers for service industries. Stratified sampling by turnover or number of employees could be used. Shrinking markets (in terms of the number of enterprises and/or overall activity of the sector) may lead to a loss of respondents over time so the sample should be reviewed at regular intervals.

The weighting structure for the survey –expressed in terms of turnover- is based on parameters such as origin and destination of transport, quantity of freight, type of freight and type of cargo. The breakdown of the weighting structure is dependent on available information from transport or business statistics, general market information and specific surveys of companies (questionnaire on turnover, kind of transports etc.). The weighting structure is the basis for the selection of representative transport services in the price survey.

4. Main pricing methods

The most general method applied for pricing services in this industry is contract pricing for scheduled transports.

Contract pricing for scheduled transports

The survey aims at collecting actual prices including price reductions (i.e. not list prices) for transport between the same origin and destination and for the same cargo repeated on an ongoing basis for a set of regular clients. Surcharges for the client (e.g. Fuel adjustment Factor, port charges, war risk) should be included.

For tramp shipping it is difficult to define representative transports which are comparable over time as there are no regular transports with identical specifications. This makes pricing difficult.

5. Costs and benefits of the alternative pricing methods

The pricing methods of the countries reviewed (China, Germany, Sweden, UK) do not vary essentially, all employing contract pricing for scheduled transports to a large extent.

6. Quality issues

Precise specification of transport services is necessary and must be kept constant over time. As in transportation services in general, one should be vigilant that advances of technology and logistics will be taken into account through their impact on prices.

7. Collection of information and specification of services

The products selected for the price collection shall be representative for the business. Therefore in consultation with the companies statistical offices choose a number of transport services which are representative for the business activity and which are conducted regularly in the same way. Information on the main transport activities of companies may come from transport statistics or from commercial sources.

These services are specified as detailed as possible regarding the main price determining parameters. These parameters are, among other things,

- origin and destination of the transport,
- type of freight,
- weight or volume for non-containerised cargo,
- size of container,
- type of cargo (general, dangerous or refrigerated),
- need for services (loading/unloading, storage etc.).

The specification of services needs to be reviewed regularly.

8. Specific aspects

The increasing share of container transport must be taken into account. A definite allocation of container freight in terms of product classification is not always possible. The index structure therefore should mainly focus on traffic relations i.e. principle origins and destinations. A distinction of different types of goods is advisable only at the second level where this information is available.

9. Overview of national methods

General remark:

Most services within this industry are international transports. The market for international sea freight transports is extremely internationalised, especially in a region with many smaller countries like the EU. This is to an even higher degree the case for intercontinental transports which are a prime object for price measurement. Companies compete directly with those of other countries. Moreover, the services delivered are not tied to the harbours of the country that the company resides in. For example, Panamese companies (can) tender for exactly the same services as British and Indonesian companies. The SPPI's of different countries should therefore largely coincide, especially in longer time-series. Additionally, international competition may cause companies to dispute statistics that show that their prices rise faster than those in other countries. Some NSI's are interested to cooperate in the development or common compilation of price statistics.

China (Hong Kong)

Hong Kong is well known as a major international maritime centre and has maintained its position as one of the world's busiest container ports.

An SPPI is published for the maritime transport as a whole covering both sea passenger transport and sea freight transport. A separate SPPI for sea freight transport services alone is not published.

Producer prices for sea freight transport are quarterly averages of actual transacted prizes net of any discounts, premiums, rebates or allowances given to buyers, but including surcharges. Respondents provide price data for transport services which are typical and representative for their company, are based on stable and continuing transactions and – for the respondent - are readily available. Respondents are also asked for the total amount of business receipts of sea freight services plus receipts in respect of individual major services, and receipts for prominent product items of major service products.

Data are collected through the quarterly survey of service industries covering establishments engaging five or more persons. The survey is a stratified sample. A rotational replicate sample design is adopted. Every year about one-third of the sample is updated to include newly selected

establishments while one third of the sample is rotated out.

Germany

The German index of sea freight rates refers only to liner trades (the statistical observation of tramp shipping was ceased in 2003). Freight rates are collected monthly through a sample from German shipping companies, ship brokers and agencies. This monthly data collection is useful as sea freight rates are very volatile over time due to the influence of political or economic crisis in various parts of the world. Currently 20 of the dominant German market competitors are monitored.

Freight rates are calculated for each type of good with regard to a specific traffic relation on a pier/pier basis. The objective is to cover the effective rate (i.e. including discounts etc.). For the index computation a total of 117 traffic relations are selected. In combination with different types of goods 672 index positions have been formed. For the weighting structure the detailed material of transport statistics (mainly physical data) was used. Additional modelling to convert physical data into monetary data was necessary.

The breakdown of the index of sea freight rates in the publication is divided into homeward-bound and outward-bound trades. An additional regional breakdown of the results by the four traffic relations of Europe, Africa, America, and Asia/Australia is available.

For tramp shipping until 2002 specific information on ship transports was taken from the specialised press but quality issues could not be dealt with due to a lack of detailed information. Because of the unsatisfactory quality of the results this kind of survey was ceased in 2002.

Sweden

The sea freight market for Sweden is international and there are several submarkets in which the price system works in different ways. The market that, from an international viewpoint, is dominant in terms of volume is the tramp market. Line cargo shipping is the second largest sub-market, in which traffic is mostly carried out by large container vessels that service particular ports. In Sweden there are a lot of sea and coastal freight transport companies but the industry is dominated by a few large companies.

The price collection for the sea and coastal freight transport services has been carried out from the third quarter of 2003. The index has been developed in cooperation with the Swedish Shipowners' Association and large enterprises in this industry. Prices are collected on a quarterly basis.

For the price surveys Sweden applies model pricing[59] choosing a number of services which are representative for the business activity, these being specified as detailed as possible regarding type of freight distance of transport and customer. The key criteria for the use of Model Pricing are: Regular updating of the models used, representativeness of the models and actual price charged.

For the spot market (tramp shipping) the envisaged method for the survey seems to be inappropriate. Further discussions with enterprises operating in the market are necessary.

UK

The UK sea freight industry represents around 20% of total freight volume. Whilst only around 7% of domestic freight tonnage moves by water (as road and rail freight are more economic and convenient), 95% of international freight tonnage is transported by sea. The geographical position of the UK makes sea freight an important industry. Notwithstanding the gradual decline in UK sea freight activity over the past few years (due to shifting trading routes, low-cost competition, higher operating costs, Channel Tunnel, etc.), it still represents around 4% of global trade.

The UK index into sea freight is split into three main categories: coastal (domestic); near sea (Europe); and deep sea (rest of world). These are then split by type of cargo: crude oil; other bulk liquids or gases; dry bulk goods; liner service cargos; frozen chilled or temperature controlled cargo; vehicle freight; and other freight. Prices are collected either on an actual contract basis or using tariff rates (including discounts) charged to

[59] In essence the Swedish approach -despite deviation in terminology- seems almost identical with the method of the other countries which is described as contract pricing (direct use of prices of repeated services)

UK businesses for scheduled services on specific trade routes.

4.4 Air transport

1. Description of the sector (ISIC 621, 622 / NACE 62.10, 62.10)

The Air Transport Service industry may be of different sizes across countries, but in the majority of countries the industry is quite similar in nature. That is, the number of large enterprises is rather small for passenger air transport, whereas small providers are prevailing for other kinds of air transport, also including air taxis and air sightseeing. During the last few years a number of new, mostly small, air carriers have come into the market trying to compete by offering low air fares (the so-called low-cost airlines). How much these low price carriers count for business flights is not yet fully evident, but needs to be monitored into the future. As stated in Chapter 1.1, an SPPI for a service sector should comprise all end-users (business to business, business to government, business to households, export). In practice, in the air transport sector, it is often difficult to separate prices for different end-users. If this is the case for a country then it may be easier to consider compiling an SPPI which covers all users in one estimation.

Air transport services cover three major categories of services, scheduled air transport as well as non-scheduled air transport and space transport. Furthermore a distinction can be made whether passengers or freight is being transported.

Several papers concerning air transport services have been presented at the 18th and 19th meeting of the Voorburg Group on Service Statistics in 2003 and 2004. Contributors have been Sweden, New Zealand, Austria, the UK and the USA (See paper).

2. Classification aspects and scope of the survey

In the International Standard Industrial Classification (ISIC Rev.3.1) for division 62 the only distinction drawn is between Scheduled and Non-Scheduled Air Transport. Space transport is added as a supplementary group to division 62 in NACE Rev.1.1[60].

According to CPC Rev.1.1[61] the corresponding activities for air transport services vary over: **(1)** passenger air transportation on regular routes and on regular schedules; transportation of passenger baggage and other items that may be carried at no extra cost, **(2)** passenger air transportation on a non-scheduled basis supplied in aircraft of any type; sightseeing services and air taxi services by helicopters; transportation of passenger baggage and other items that may be carried at no extra cost, **(3)** transportation of letters and parcels by air on scheduled and non-scheduled flights, **(4)** air transportation of individual articles and packages assembled and shipped in specially shipped containers designed for ease of handling in transport; air transportation on freight not elsewhere classified. Furthermore, **(5)** space transportation services; launching and placing of satellites in space; services provided by space laboratories and **(6)** rental and leasing services of freight- or passenger-carried aircraft of any type and for any purpose with crew.

The following table illustrates the appropriation of CPC codes to the corresponding ISIC codes.

[60] Statistical classification of economic activities in the European Communities.

[61] Central Product Classification

Table 4.4.1 ISIC and CPC codes for the Air Transport industry

Air Transport			
ISIC code Rev. 3.1	**Description**	**CPC code Rev. 1.1**	**Description**
I 62	Air transport		
I 6210	Scheduled air transport	66110	Scheduled air transport services of passengers
		66210	Air transport services of letters and parcels (scheduled)
		66290	Air transport services of other freight (scheduled)
		66400	Rental services of aircraft with operator
I 6220	Non-scheduled air transport	66120	Non-scheduled air transport services of passengers
		66210	Air transport services of letters and parcels (non-scheduled)
		66290	Air transport services of other freight (non-scheduled)
		66300	Transport services via space
		66400	Rental services of aircraft with operator

The national versions of the above mentioned CPC classification may slightly vary among each other because of different country characteristics. Efforts to compile an SPPI for air transport activities are known to be made by Sweden, UK, New Zealand, USA, Australia, Hong Kong, Japan and Austria. The main focus lies on business passenger- and freight transportation services on regular routes and on regular schedules.

The price indexes are primarily used as deflators in National Accounts, for compiling volume measures in business service statistics and as a short-term indicator of inflationary pressures in the industry.

3. Sample design

The sampling frame should comprise all producers of air transport services. Business registers are normally considered a reliable source due to the somewhat specialised nature of the industry but it is important to ensure companies specialising in providing air-freight services are including in the frame.

Generally the frame could be stratified by sub-sector (e.g. the CPC classifications above) and size group using turnover as a size variable. In theory, any available probability based sampling strategy can be used. In practice, due to the size and structure of the industry, the potential sampling techniques may be reduced to stratified probability proportional to size sampling or purposive sampling. Rotating samples can only be used in countries with a large number of small to medium enterprises in the air transport sector, as all large firms should be included.

4. Main pricing methods

The direct use of prices of repeated services and the unit value method seem to be the most adequate pricing methods in this industry.

4.1 Passenger Air transport

Direct use of prices of repeated services

Taking account of already existing tariff information systems, the direct use *of prices of repeated services* is one of the most appropriate pricing methods for scheduled passenger air

transport services. The most important destinations are to be combined with representative ticket types. This will result in a number of price quotations on a regular base. A variable of considerable influence on the price is how long in advance a ticket is bought (six months, one month, two days).

Unit value method

An alternative solution, to avoid price fluctuations which may occur from using a sample of prices *of repeated services*, is to collect unit value prices for different representative types of tickets and routes. If airlines are willing to cooperate, average prices for representative routes and tickets can be surveyed quarterly for business and economy class tickets.

4.2 Air Freight Transport

Direct use of prices of repeated services

For freight transportation by air the direct use *of prices of repeated services* would also be an eligible method to compile an SPPI. Representative transactions specified by an accurate description of type of freight, weight of the cargo, destination, distance etc. should be chosen in cooperation with leading enterprises and airlines. Either standard transactions for all enterprises or specific transactions for each enterprise can be selected.

As the price of airline tickets can vary considerably over short periods of time it is important to ensure that enough prices are collected to be representative of the survey period. However the collection of point-in-time prices may be more acceptable for freight services.

5. Costs and benefits of the alternative pricing methods

The collection of prices for a number of ticket and destination combinations is a rather simple but nevertheless very effective method in the sector of scheduled passenger air transportation. The crucial factor lies in the sampling of representative ticket types and destinations. A sample of destinations can be drawn after investigating civil aviation statistics, which might not allow distinctions between passengers according to their purpose of travel. Such estimates are necessary in addition to using information from passenger surveys, etc. Representative ticket types can be sampled in cooperation with leading business travel agencies and major airlines.

For both the direct use *of prices of repeated services* and *unit value prices*, it is of particular importance for price statisticians to establish long term cooperation with the relevant industry bodies to ensure the selected price quotations are kept up-to-date. If a chosen transaction is no longer representative, it should be immediately replaced.

6. Quality issues

As mentioned above, in some countries due to a lack of available data it may be difficult to distinguish which types of destinations and fare types are for business or leisure purposes. Consequently it may be difficult to obtain reliable data for weighting purposes to split business and leisure travellers into different elementary aggregates. However, in the absence of reliable statistical data, consultation with industry experts (e.g. leading travel agents) may enable the estimation of an approximate breakdown between the proportion of turnover derived from business and leisure travellers by fare type and destination. Another concern is how to deal with changes in fares and service characteristics. Changes in fare prices are often accompanied by changes in the quality of the service such as the introduction of charges for meals, changes to booking conditions, duration of tickets and changes to the quantity of free baggage allowed. Furthermore there is not yet an internationally agreed approach to the question of how to treat frequent flyers in an index.

Whilst no perfect solutions to deal with these quality problems have been found until now, Statistics New Zealand initiated a case study dealing with some of these quality issues which was reported as a mini presentation paper at the Tokyo 2004 Voorburg Group meeting (See paper).

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with responding airlines and enterprises, prices can be collected by mail or fax. If airfares are partly covered by the national CPI the collection of the SPPI relevant data can be combined with the monthly CPI survey in order to minimise respondent burden.

In order to work efficiently on quality and price changes it is advisable to have well trained staff and an ongoing program of review for sampled prices to ensure they remain representative of the market.

8. Specific aspects

As pointed out earlier, one of the major problems is to distinguish between business and leisure travellers. In general airlines are not able to make such kind of data available and other sources must be found. For example the UK uses data from the International Passenger Survey, carried out by the ONS, to estimate the percentage of business passengers per destination.

Any such data should include national enterprises providing services inside and outside the national territory. Subsidiaries of foreign enterprises should also be included in the population. Whether their prices are collected should depend on their market share within the national market.

Additional charges, like airport taxes, which may influence the price, should be excluded if they are not retained by the service provider. However sur-charges imposed by companies to cover rising input costs (e.g. fuel) must be included. The surveyed price should be the price offered by the airline. Intermediary providers should be excluded for an SPPI.

Theoretically the price for an observed service should be recorded when the service is provided, i.e. obeying the accrual principle (see chapter 1.6.1). The same rule also applies for recording output. However, the present SNA/ESA does not provide guidance on how this principle should applied for activities like air transport where services are typically paid well before the service delivery. Developing rules for these kinds of situations is included in the ongoing SNA revision programme.

In the future, low-cost carriers have to be included in the sample to avoid biases due to an unrepresentative market situation.

9. Overview of national methods

Sweden currently produces an overall quarterly index for air transport, which consists of a domestic scheduled passenger air transport index and an international scheduled passenger air transport index. In consultation with the enterprises average prices for representative routes and types of tickets are surveyed quarterly for business and economy class tickets. As a result of a methodological change in 2004, the publication of the PPI for domestic scheduled passenger air transport was stopped due to confidentiality reason. In Sweden indexes for the different flight routes, both for domestic and international scheduled passenger air transport, are weighted together to get a total index. Non-scheduled air transport is excluded from this index. An SPPI for air freight transport is currently under construction.

In 2001, the UK air transport industry generated an annual turnover of around £15 billion. During this period approximately 180 million passengers travelled into and out of the country by air. There are around 40 UK airlines operating large aircraft with scheduled and non-scheduled passengers and cargo services. Of these, 27 operators provide dedicated scheduled passenger air transport, representing around 72% of UK airline revenue. In recent years, air travel has been the most used mode of transport to and from the UK with business travellers accounting for around 20% of total air passenger journeys. The UK air passenger industry has been growing by an average annual rate of 6% over the past ten years, largely due to deregulation; lower ticket costs; globalisation; and more leisure travel.

The UK business airfares index aims to observe movements in prices charged by UK airlines to UK business passengers. However, the classification system for scheduled passenger air transport does not enable distinction between business and leisure travel. The index therefore includes transport of leisure and business passengers, over regular routes and on regular schedules. Prices are collected from the three main service providers either through the UK Civil Aviation Authority or directly. This represents 55% of passengers and covers 14 long-haul, 17 European and 9 domestic destinations. In the majority of cases, the unrestricted business class fare is taken as the representative business customer tariff. Where there is no business class, economy fares are taken. The sample includes an appropriate mix of single journey and return fares. The UK does not currently produce an index for air freight transport.

New Zealand currently publishes a quarterly single air transport index which falls within the

transport and storage index of the SPPI. It includes aircraft engineering services, air freight transport (international and domestic), air passenger transport (international and domestic) and other air transport. As in other countries for passenger air transport business and economy class tickets for a number of destinations are surveyed. For air freight transport a number of different specified types of freight for a number of destinations are surveyed. Due to confidentiality reasons the SPPI cannot be published at that detailed level.

The **U.S.** SPPI has calculated a price index on scheduled passenger air transportation since 1989, which is based on information obtained directly from airlines. This index, which is published monthly, only covers domestic carriers and the pricing data excludes taxes and airport fees. Currently, the U.S. SPPI measures this industry by collecting monthly average revenue (turnover) per passenger for specific seats on selected flights, i.e. *the unit value* method. Total passenger revenue (turnover) and total passengers for select origins and destinations (O & Ds) for a given passenger class (first class, including business or coach) are collected each month directly from the airlines. Separate indexes are published for domestic first class, including business; domestic coach; and international.

Austria has finished the first preparatory work, and is going to compile an index for scheduled air transport of business passengers by using *prices of repeated services*. Since 2000 expenditure on airfares is included in the CPI, whereby no separate sub-indexes for the various destinations are produced. After installing a survey routine for scheduled passenger air transportation the air freight transport sector will be investigated.

4.5 Cargo handling

1. Description of the sector (ISIC 6301 / NACE 63.11)

This chapter describes the cargo handling industry in specific detail for the case of New Zealand, therefore the characteristics and treatment of this industry in an SPPI may differ in other countries. Some specific issues related to classifications and coverage where these differences are likely to occur are included in the following description, although only to a limited extent.

Transport and Storage is an industry of strategic importance for New Zealand. New Zealand's remoteness and insular location are factors which have influenced the development of this industry.

Cargo Handling is one of the sub-industries within the larger Transport and Storage industry. The structure of this sub-industry is highly competitive and, as a result, the enterprises involved in this activity are among the most efficient on a global scale. In New Zealand this group contributes less than 10 percent to the Gross Domestic Product (GDP) of the Transport and Storage industry. The Transport and Storage industry contributed approximately 5.0 percent to the total GDP in the year ending March 2004.

Different types of companies can be found in this sector. Typically, it includes:

- operators of cargo handling facilities in seaports and domestic ports,
- container terminals for combined transport,
- hubs for freight transport by road (not operated by a freight forwarder for own purpose),
- companies performing air cargo handling.

Generally speaking, all companies offering cargo handling services provided for freight or passenger baggage, or services of freight terminal facilities for all modes of transport, including stevedoring services, belong to this sector. However in New Zealand, due to the structure of the national industry classification (see point 2 below), only stevedoring services are covered in the relevant SPPI. Therefore the description which follows is somewhat limited in scope relative to the likely coverage of activities for cargo handling in other countries.

A few large companies dominate this sub-industry. These companies participate in most of the surveys conducted by Statistics New Zealand and respondent burden is a serious issue for them. In addition to the respondent burden issue, the limited number of firms in this sub-industry brings an additional challenge: a rotation policy cannot be implemented for the SPPI.

2. Classification aspects and scope of the survey

The commodity classification used in the current SPPI structure is the 1996 Australian and New Zealand Standard Commodity Classification (ANZSCC96). This classification has been developed for use in Australia and New Zealand and is based on a provisional version of the international Central Product Classification (CPC). Between 2004 and 2008 a new classification will be implemented: the Australian and New Zealand Standard Product Classification (ANZSPC01), which is based on a final version of the CPC (version 1) that better reflects contemporary standards.

The industry classification currently being used in the indexes in New Zealand is the 1996 Australian and New Zealand Standard Industrial Classification (ANZSIC96), which is based on ISIC Revision 3. Work is currently underway to release an updated version for ANZSIC in 2006 (based on the North American Industry Classification – NAICS).

Under ANZSIC96 this sub-industry falls within the Other Transport and Storage Services group in the Transportation and Storage industry.

The cargo handling index within the PPI falls under the main representative commodity index stevedoring services. Other cargo handling services appear throughout other parts of indexes within the Transportation and Storage Industry, however these will not be looked at in this description due to the smaller weights applied to them.

Stevedoring services consists of units mainly engaged in the provision of labour for the loading or unloading of vessels. The index classification is as follows:

Division I: Transport and Storage

Sub-division I66: Services to Water Transport

Group I662: Services to Water Transport

Class I6621: Stevedoring

Sub-Class I662100: Stevedoring

3. Sample design

Statistics New Zealand's Business Frame (BF) comprises the universe of companies classified as having the main business activity in a given industry/sub-industry. The sample size is selected by employing a number of criteria such as: size of company, location, general survey burden.

Purposive sampling could be used with good results, in countries where the number of companies involved in this industry is limited.

4. Main pricing methods

An annually chain-linked Laspeyres formula is used to calculate the price index for the Cargo Handling industry. The Laspeyres price index was chosen to meet National Accounts requirements that the index be consistent with their deflation practices in other areas. There are two main pricing methods used for the cargo handling industry:

3. Direct use of prices of repeated services, which can be standardised and gives a direct collection of detailed specifications;
4. Charge-out rate, which estimates the price of the service based on the charge-out rate of the person providing the service.

As noted above cargo handling falls under the main representative commodity index stevedoring services.

Stevedoring is a labour intensive operation, so the major expense for stevedoring firms is salaries and wages. The approaches used for this index are a combination of charge-out rates and direct use of prices of repeated services for a set of standardised services.

The stevedoring services index contains 29 items (all excluding VAT) with approximately six different respondents being surveyed using the Commodity Price Survey and one using an internal source, namely the Labour Cost Survey. A range of prices are collected for the processes involved in the loading and stowing of cargo. The price specifications for these items are any one or a combination of the following:

- Cargo handling (ship exchange):
    i. rate per 20 foot ISO container;
    ii. hiring of container cranes, 3 to 7.5 tonne mobile cranes or light fork lifts.
- Washing of containers (per 20 foot ISO container).

- Berthage - charge for gross registered tonnes (i.e. 100,500 or 5,000) per day.
- Stevedoring (palletised general goods):
    iii. per 20 foot ISO container;
    iv. per tonne;
    v. receiving/ delivery of cargo.

During a previous redevelopment (1995-1998), Statistics New Zealand introduced a "building block structure" for the SPPI. In this structure, prices collected for a service represent the lowest level; they are followed by commodity indexes (elementary aggregates) which are further combined into sub-industries (National Accounts Working Industry – NAWI). Weights for items priced within the commodity indexes are obtained from respondents in the sample. The weights for the commodity indexes and the National Accounts Working Industry Indexes (NAWI) are obtained from income and expenditure information in the Annual Enterprise Survey (AES). Statistics New Zealand sums the SPPI weights to 10,000 for calculation purposes and expresses them as percentages for publication of index regimens.

5. Costs and benefits of the alternative pricing methods

Direct use of prices of repeated services

Transaction prices should be used wherever they are practically possible as they reflect the actual price charged for the provision of a given service. Generally these should be available for the set of standard services offered such as those listed in the dot points in section 4. List prices are readily available with little or no respondent burden but they do not necessarily represent real price evolution in the market. Discounts may be very sensitive to the prevailing market situation.

Charge-out rates

Charge-out rates are easy to use in pricing but they do not take into account changes in productivity. When using them it is better to use realized charge-out rates rather than list prices because of sensitivity of prices for the market situation.

6. Quality issues

Services provided by this industry are subject to some quality variation over time. This makes it sometimes difficult to monitor these changes effectively so that only pure price change is recorded. An example of this is the provision of services where in recent years there has been considerable improvement in the general timeliness (due to increased use of modern technology) 1. Services in this sector are sometimes bundled and this further complicates the task of estimating the real price change.

Quality variations such as those mentioned above are accounted for when possible. Alternative specifications are sought when a given service is no longer representative for a company.

7. Collection of information and specification of the services

Statistics New Zealand uses the Commodity Price Survey (CPS) as the main price vehicle survey for SPPI. Actual response rates for these sub-industries are above 95 percent. Key companies are managed by a group of account managers.

8. Specific aspects

The Cargo Handling industry is not characterized by rapid change. It is recommended to review the commodity and item weights every three to five years.

9. Overview of national methods

The United States of America, New Zealand, Japan and Australia all compile a price index for Cargo Handling. The USA collect transaction prices from over 100 respondents for simple cargo handling services on a monthly basis. In New Zealand and Japan smaller numbers of respondents are surveyed but composite and bundled services prices are collected. New Zealand's index is compiled quarterly whilst Japan's is monthly. Australia uses list prices in the construction of their quarterly Cargo Handling index.

4.6 Storage and warehousing

1. Description of the sector (ISIC 6302 / NACE 63.12)

Transport and Storage is an industry of strategic importance for New Zealand. New Zealand's remoteness and insular location are factors which influenced the development of this industry.

Storage and Warehousing is one of the sub-industries within the larger Transport and Storage industry. The structure of this sub-industry is highly competitive and, as a result, the enterprises involved in this activity are among the most efficient on a global scale. As with the Cargo Handling group, this group contributes less than 10 percent to the Gross Domestic Product (GDP) of the Transport and Storage industry. The Transport and Storage industry contributed approximately 5.0 percent to the total GDP in the year ending March 2004.

A few large companies dominate this sub-industry. These companies participate in most of the surveys conducted by Statistics New Zealand and respondent burden is a serious issue for them. In addition to the respondent burden issue, the limited number of firms in this sub-industry brings an additional challenge: a rotation policy cannot be implemented for the SPPIs.

2. Classification aspects and scope of the survey

The commodity classification used in the current PPI structure is the 1996 Australian and New Zealand Standard Commodity Classification (ANZSCC96). This classification has been developed for use in Australia and New Zealand and is based on a provisional version of the international Central Product Classification (CPC). Between 2004 and 2008 a new classification will be implemented: the Australian and New Zealand Standard Product Classification (ANZSPC01), which is based on a final version of the CPC (version 1) that better reflects contemporary standards.

The industry classification currently being used in the indexes in New Zealand is the 1996 Australian and New Zealand Standard Industrial Classification (ANZSIC96), which is based on ISIC Revision 3. Work is currently underway to release an updated version for ANZSIC in 2006 (based on the North American Industry Classification – NAICS).

Under ANZSIC96 this sub-industry falls within the Other Transport and Storage Services group in the Transportation and Storage industry and is classified as follows:

Division I: Transport and Storage

Sub-division I67: Storage

Group I670: Storage

Class I6709: Storage not elsewhere classified (nec)

Sub-Class I670900: Storage nec

This sub-class consists of units mainly engaged in providing storage and warehousing services nec.

3. Sample design

Statistics New Zealand's Business Frame (BF) comprises the universe of companies classified as having the main business activity in a given industry/sub-industry. The sample size is selected by employing a number of criteria such as: size of company, location, general survey burden.

Purposive sampling could be used with good results, in countries where the number of companies operating in this sector is limited.

4. Main pricing methods

An annually chain-linked Laspeyres formula is used to calculate the price index for the Storage industry. The Laspeyres price index was chosen to meet National Accounts requirements that the index be consistent with their deflation practices in other areas. There are two main pricing methods used for the storage and warehousing industry:

1. Component pricing, which is sometimes desirable if service bundles are to be priced;
2. Direct use of prices of repeated services, which can be standardised and gives a direct collection of detailed specifications.

The storage services index contains 18 items (all excluding goods and services tax - GST) with approximately 12 different respondents being surveyed using the Commodity Price Survey. A range of prices are collected for the storage of

specific goods. The price specifications for these items are any one or a combination of the following:

- General storage (assorted storage, basic storage, static storage, palletised goods, general goods):
  i. short and long-term storage,
  ii. per metre or per pallet per week (1.2 cubic metre pallet),
  iii. covered space,
  iv. not stackable, of reasonable standard of care, away from dust,
  v. basic handling charge.
- Frozen/cool storage (at -18 degrees Celsius or colder):
  i. small/large quantities,
  ii. first / second / subsequent month's storage,
  iii. per 100kg or tonnes per month.
- Standard storage (milk powder, paper and wood products):
  i. per metres squared or 20/40 foot ISO container62 per day,
  ii. per 1 000kg per day.
- Reefer[63] charges (power supply/storage):
  i. per refrigerated container,
  ii. per day or part thereof.

Additional services play a more and more important role in the storage and warehousing industry. Services like tagging, packing or order picking have become a standard and are often included in warehousing contracts. Therefore, it should be considered whether to include them in the price index for storage and warehousing. Including these services together with standard services such as those specified above as part of a representative bundled service could then be priced using the component pricing method.

During a previous redevelopment (1995-1998), Statistics New Zealand introduced a "building block structure" for the PPIs. In this structure, prices collected for a service represent the lowest level; they are followed by commodity indexes (elementary aggregates) which are further combined into sub-industries (National Accounts Working Industry – NAWI). Weights for items priced within the commodity indexes are obtained from respondents in the sample. The weights for the commodity indexes and the National Accounts Working Industry Indexes (NAWI) are obtained from income and expenditure information in the Annual Enterprise Survey (AES). Statistics New Zealand sums the PPI weights to 10,000 for calculation purposes and expresses them as percentages for publication of index regimens.

5. Costs and benefits of the alternative pricing methods

Component pricing

Component pricing can be used to represent bundled services which may often be unique depending on individual customer needs. Respondent assistance is required to initially design the bundle of services to include in the component pricing model, and to consistently ensure that the model continues to represent the real world transactions occurring as time goes on. The component services included in the model, which would generally be a combination of standard storage services, should be based on transaction prices. As the method may add significantly to respondent burden it is important to get a good balance between the complexity of the component pricing model and the burden it imposes.

Direct use of prices of repeated services

Transaction prices should be used wherever they are practically possible as they reflect the actual price charged for the provision of a given service. Generally these should be available for the set of standard services offered such as those listed in the dot points in section 4. List prices are readily available with little or no respondent burden but they do not necessarily represent real price evolution in the market. Discounts may be very sensitive to the prevailing market situation.

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[62] International Organisation for Standardisation. Designed for transportation by more than just one mode such as truck and rail or rail and ship.

[63] Refrigerated container. Used to keep perishable goods such as meat and fruit frozen or chilled.

6. Quality issues

Services provided by this industry are subject to some quality variation over time. This makes it sometimes difficult to monitor these changes effectively so that only pure price change is required. An example of this is the provision of warehousing services where in recent years there has been considerable improvement in the general timeliness (due to increased use of modern technology) and in the productivity level. Services in this sector are sometimes bundled and this further complicates the task of estimating the real price change.

Quality variations such as those mentioned above are accounted for when possible. Alternative respondents are sought when a given service is no longer representative for a company.

7. Collection of information and specification of the services

Statistics New Zealand uses the Commodity Price Survey (CPS) as the main price vehicle survey for PPIs. Actual response rates for these sub-industries are above 95 percent. Key companies are managed by a group of account managers.

8. Specific aspects

The Storage and Warehousing industry is not characterized by rapid change. It is recommended to review the commodity and item weights every three to five years.

9. Overview of national methods

A larger number of countries produce price indexes for the Storage and Warehousing industry. The USA collects prices from around 200 respondents on a monthly basis, the prices collected are for bundled or composite services. Australia collects annual prices for grain storage services and quarterly prices for other storage services. The prices collected for grain storage are a simple service type while for other storage services prices are a mix of simple and composite type prices. Around 125 respondents are surveyed in total. Quality changes are taken into account on a case-by-case using the method most appropriate for the situation.

Other counties with Producer Price Indexes for Storage and Warehousing are: New Zealand, Mexico, Hong Kong and Japan. All countries price the industry using simple service type prices. New Zealand and Hong Kong produce the indexes on a quarterly basis while in Mexico and Japan it is monthly. In all cases countries rely on respondents to provide estimates of how much change in price is due to changes in quality.

4.7 Post and courier services

1. Description of the sector (ISIC 641 / NACE 64.1)

The different services of post and courier activities could be summarised as the collection of documents, letters and parcels (in general, light freight) and delivery to the required destination. The time between collection and delivery is one of the most important differences in quality among the variety of services.

The total turnover of postal and courier services represented 0,94% of the EU25-GDP in 2001. Nearly 80% of the total turnover of this sector was invoiced by National Post activity, and the rest, by courier services other than National Post activities. The courier services have a larger fraction of turnover in some other countries like Australia and the US, but the postal services are typically dominating the industry.

The postal market is for historic reasons usually dominated by a single producer. If there is any competition, it exists only in certain parts of the market like mass mail or international mail. Despite legislation to allow competition and liberalise the market, full competition on all postal services is unlikely because of the nature of the activity. These monopoly situations make international exchange by SPPI experts harder, as most national statistics institutes have confidentiality regulations against publishing methodological details of the SPPI compilation due to the monopolist.

The market for courier services is in direct contrast to the market for postal services in that it is highly competitive. Nowadays, the sector 'Courier services other than National Post' is changing, due to the fact that enterprises are diversifying their output. Companies are offering logistic, storage and freight transport by road services to their customers. In addition, freight transport by road firms are competing directly with couriers, because they offer courier services

as well. This issue may imply classification problems.

Globalisation is also affecting these enterprises. Companies are establishing alliances with companies abroad, in order to improve the international delivery of parcels.

In the Voorburg Group meetings of 2003 and 2005, several countries provided mini-presentations that summarise their experiences regarding SPPI for courier activities. (See Austria, Canada, UK, USA, Canada, Netherlands, Sweden).

64.1 Post and courier activities

64.11 National post activities

This class includes:

- pick-up, transport and delivery (domestic or international) of mail and parcels,
- collection of mail and parcels from public letter-boxes or from post offices,
- distribution and delivery of mail and parcels,
- mailbox renting, postal forwarding, etc.

This class excludes:

- postal saving activities and other financial activities carried out by national post administration (see 65.12).

64.12 Courier activities other than national post activities

This class includes:

- picking-up, transport and delivery of letters and mail-type parcels and packages by firms other than national post. Either only one kind of transport or more than one mode may be involved and the activity may be carried out with either self-owned (private) transport or via public transport.

This class also includes:

- home delivery services,
- city messenger and goods taxi services.

2. Classification aspects and scope of the survey

NACE Rev. 1.1 describes this sector as follows:

Households and enterprises are both National Post companies' clients although enterprises (including government) are by far the largest clients (90-95% in value). Courier and local messenger firms focus their activity on companies. There are also some differences between the services they offer. Normally, national post services are more routine and have very specific characteristics that cannot be changed. On the other hand, courier companies can offer 'tailor-made' services, signing contracts with their clients by fixing prices depending on the volume of documents, parcels that they have to send from one point to another.

The structure of the population of courier enterprises is quite similar from country to country, within European countries. Most companies have few employees (small and medium size enterprises), but the biggest companies dominate the turnover of this activity. In other words, this sector is controlled mainly by large companies.

The structure of the population of postal enterprises is even more extreme: one company dominates the market. This one company has typically a weight of at least half in the SPPI for total postal and courier services, but possibly as much as three quarters.

The market share by size of business for the entire activity of Postal and Courier services combined is shown in table below for the EU-25 based on data from 2001.

Size class (64.1 NACE Rev.1.1)	% No enterprises	% Turnover	% Number of persons employed
1-4	82.89	2.65	2.14
5-9	7.84	1.33	1.03
10-19	4.52	1.67	1.24
20-49	2.44	1.88	1.47
50-99	0.90	1.63	1.21
100-249	0.88	1.47	2.35
250-499	0.22	1.60	1.40
500-	0.31	87.76	89.17

Source: EUROSTAT-Newcronos

There is an important classification problem to distinguish between courier firms and freight transport by road firms. As mentioned above, both kinds of enterprises can offer similar services although the weight of the goods transported is usually the border to differentiate between 'courier services' and 'freight services'. However, there is not a universal rule and depending on the country the definition of these services varies. Normally the frontier is established that up to 20 kg is considered as a postal and courier service and heavier that this is freight transport).

3. Sample design

As mentioned before, the structure of population of this sector is quite similar from country to country.

The population of class 64.11 (National post activities) is made up one dominant firm and possibly a small number of other enterprises. If the smaller companies have a significant market share, the best option is to include them in the sample.

The main challenge of sampling within postal services is not the choice of firms, but which submarkets and services are sampled within the dominant postal firm/monopolist. It is important to keep in mind that the household share of postal services is very small and not representative of the overall activity. Additionally, price movements can differ by product or client type, depending on the liberalisation of the market. For instance, if only the international postal services are liberalised in a certain country, it is important to get specific price data on this submarket as well as

weights of this sub-market in the total, because price change in this submarket may differ from other submarkets. Additionally, volume discounts may apply and specific contracts about services and prices are made with the larger clients like banks and insurance companies. On the other hand, if the market is free of competition, the postal monopolist is in no need to offer any discounts.

For courier companies, PPS sampling, by turnover or number of employees, is advisable. As discussed above, as the big enterprises usually lead this market these enterprises should be always in the sample.

Another option is to include in the sample only the biggest enterprises (cut-off sampling), when they represent nearly the entire market (e.g. greater than 80%) and control the evolution of prices. This is a measure to reduce the response burden on small enterprises.

4. Main pricing methods

The most common methods used for an SPPI on post and courier services are the following:

Model pricing

Sets of services are described in detail and respondents price them each quarter. The selected services have to be representative of common transactions within each relevant sub-sector of activity, and should be replaced if they become less representative of the activity of the relevant sub-sector over time (e.g. if the nature of services provided within a relevant sub-sector of postal and courier services changes over time). Usually, these models are defined based on weight/size of parcels, speed of delivery and destination. Nevertheless, more characteristics could be taken into account if they influence price, for example, time of delivery, inclusion of insurance etc.

Unit value method

The units have to be defined clearly for each product or service. The units should be as homogenous as possible, e.g. letters classified by size, parcels classified by narrow weight and/or dimension categories. To ensure the homogeneity of the units, in their definition details on speed of delivery and destination must also be included. In defining the unit, detailed information about quantity of sold units has to be available which is a general restriction on the degree of homogeneity that can be achieved.

Contract pricing

Each firm in the sample chooses some of their clients (representative clients) and prices the same services (representative services) provided to the same clients on an ongoing basis. This method is feasible for large clients of a dominant postal firm.

Direct use of prices of repeated services

List prices for common services are often available, in particular for postal services. However it is important to establish the relative market share of services sold at the list price when establishing the index weighting structure to ensure they are not over represented in the index. In addition for some countries large enterprises may provide a calculator service on their internet which shows discounts which will apply to list prices based on the volume of services purchased.

5. Costs and benefits of the alternative

The main advantage of **model pricing** is that any improvements in productivity should be captured in price changes. An important point is to maintain the representativeness of the model, because if it is not representative, this method looses all of its good characteristics. It is also important to ensure that respondents include all applicable discounts when repricing the model services each period.

If the services are homogeneous and can be quality adjusted if any changes occur, then the **unit value method** is an optimum choice. A drawback is that information about the quantity of products sold is often not available at a detailed level required to ensure the homogeneity of the underlying services. In such cases care must be taken to ensure that the range of services grouped together at the lowest level that quantity data is available is relatively homogenous, otherwise the unit value method should not be used (e.g. if the lowest level of quantity data available is 'all letters' then this is too heterogeneous to consider using the unit value method).

Contract pricing is the ideal method, due to the fact that it measures the price of real services. One of the disadvantages is that it is difficult to apply to the full range of services provided by the

'The use of detailed CPIs to deflate output other than that consumed by households can be a B method if price developments can be shown to be similar for households and business. However, CPIs are unlikely to be suitable for the full range of postal services, because of the availability of discounts and the different range of products consumed by businesses. Using detailed CPIs for business purchases where it is known that businesses receive discounts or purchase a different range of products than households would be a C method'.

industry, in particular when enterprises produce unique services.

List prices can only be used if it is known that a sufficient quantity of services is actually sold at the list price.

6. Quality issues

Quality changes are easier to measure for this industry than for others, mainly because postal and courier services are defined by characteristics that are stable over time.

The main method used for quality adjustments is overlapping. This method can be applied because new and old services are generally sold simultaneously, or if not, enterprises can price the old services.

7. Collection of the information

The most frequent way of collecting data is by survey (sending a questionnaire to each enterprise in the sample) or downloading the prices from the websites of the firms (normally, only large enterprises have websites). The problem of obtaining prices from websites is that they are list prices and usually, discounts are not reflected (unless the company provides a calculator on their internet which indicates the degree of discount which will apply to a certain volume of services purchased).

The prices of postal and courier services are quite stable. Therefore quarterly collection of data is enough to study the evolution of producer prices.

8. Specific aspects

Postal and courier service products are represented in CPI. *Handbook on price and volume measures in national accounts* (Eurostat) recommends:

This guide recommends the use of a representative SPPI that takes account of quality changes and discounts as one of the best methods (A method) to deflate output. If the SPPI does not take account of quality changes or does not cover all the services, they are B methods.

It is worthwhile to invest heavily in setting up good price surveying for postal services with the dominant provider or monopolist, as this firm largely determines the total index. Confidentiality guidelines typically prohibit publishing the index for postal services. Either only the overall index for postal and courier services can be published (Australia) or only the courier services index can be published (Netherlands). The postal SPPI is generally used only by National accounts and confidential reporting to Eurostat for inclusion in EU-aggregates.

If the index of postal services shows significant change only yearly (e.g. in the first month or quarter of the year), this may be noticeable in the overall index.

9. Overview of national methods

Austria

This SPPI is in developing phase. Model pricing will be applied as the pricing method. The determining price factors selected are kind of good to handle, size, weight, destination, means of transportation, speed and time of delivery.

United Kingdom

This is defined as the collection from the premises of the customer of relatively small consignments of documents, parcels or lightweight freight (often single items) and delivery to the destination by a specific time. For this personalised service, customers are willing to pay a premium price for guaranteed door-to-door, secure delivery. It is estimated that about 95% of activity is with the business community. Couriers and express freight operators utilise all forms of road vehicles (bicycles, motorcycles, cars, vans and heavier goods vehicles) and air transport (both scheduled and non-scheduled) as well as the rail network due to the growth of high speed inter-city and continental links.

The vast majority of companies publish highly detailed tariffs for the services they provide and the geographical locations covered. The key price-determining criteria are: the nature of the consignment – mail, documents, parcels or freight; the weight of the consignment; the destination – geographical areas are divided into tariff zones, the more zones crossed the higher the charge; the timing for delivery; and any special features (highly valuable consignments or hazardous material, for example). The destination and speed of delivery also dictate the model(s) of transport required, which is another important factor. Some add a charge for insurance of goods in transit as standard; others offer it as an option to the customer. The published data for courier services has shown a steady increase, for the most part, over the last five years. The main reasons for price changes in this industry are overheads, wages and fuel costs.

Prices are collected on three bases: those based on actual contracts; those taken from quoted tariff rates (although these may not be the achieved rate in every case); or those representative of the charge companies would make for a particular delivery (a model contract).

The Netherlands

For couriers, three different types of prices are collected: list prices, fictitious (model) prices and prices of real transactions (i.e. direct use of prices of repeated services). The factors taken into account are: weight and/or size, duration between pickup and delivery, destination, insurance, tracking, inclusion of customs formalities, inclusion of extra services and bulk discounts.

For post, only one respondent has been recruited. Its products are stratified into four classes: Big corporate clients, Medium-sized corporate clients, Small corporate clients (includes household clients), and International (international mail was excluded from the first three classes). Within each class, the top-30 products (thus cut-off sample) are followed in the price survey (120 products in total). These products cover a significant portion of production.

Canada

Methodology used is based on model pricing, taking into account the following specifications for courier services prices: geographical, type of parcel by weight and speed of delivery.

For local messenger enterprises the specifications are simpler. Several cities of each Canadian region are selected and only two services are priced: delivery in one hour or less, and delivery of three to four hours.

Sweden

These indices are partly under development. The national post index is calculated using list prices from the Internet. The selection of which prices are collected have been chosen together with the National Post. They are also providing turnover to calculate the weights every year.

For the rest of companies, component pricing and model pricing are going to be used.

Spain

This index is under development with the unit value method being the methodology chosen. The units are defined in terms of weight, destination and time of delivery. Enterprises with more than 100 employees and/or 6.000.000 euros turnover are in the sample (representing more than 70% of total turnover on postal and courier activities).

4.8 Telecommunications

1. Description of the sector (ISIC 642 / NACE 64.2)

Business telecommunications is a very dynamic service industry, which is susceptible to both rapid changes in regulation, technology and customer movement to new services. It is one of the most challenging services against which to accurately capture current price changes. There is a global movement towards communications convergence, which may result in the integration of telecommunication services with IT services (telephone, computer and television). This makes both an industry-structure model and representative weighting pattern a challenging problem to establish and maintain. The industry appears to change service-contract conditions as frequently as price changes, supporting the need for an appropriate quality adjustment methodology. Owing to the importance of business telecommunications in many countries, SPPIs have been widely developed[64].

Increasing government deregulation (combined with further regulation of existing suppliers) has stimulated strong competition amongst business telecommunication service providers, with a consequent trend amongst suppliers to offer better and different services to the user community. There has been a recent increase in the number of service providers as a result of government deregulation of the industry, combined with a lowering of the entry requirements. Business-telecommunication industry structure and market share is rapidly changing and it is recommended that the product and industry weights are rebased annually, if possible. This would allow rapid industry changes to be incorporated with new product services being added and old services removed, avoiding an increase in bias of the price index as the true service structure evolves. This being said, some countries implement a base-year Laspeyres index to conform to their other PPIs.

[64] An SPPI for telecommunication services is available in most OECD countries. Different pricing methods are in use in countries. See Table 2 of the OECD PPI inventory.

2. Classification aspects and scope of the survey

The business telecommunications activity is defined within the ISIC v3.1 6420 class with service products broadly classified in CPC v1.1 as 8411 to 8416, 8422 and 8429. Although the activity and product classifications cover services of the industry in general, some flexibility is needed to ensure that service products used for a SPPI reflect adequately the real service structure of the industry. In current business telecommunications, the product groupings are largely influenced by marketing, technological and regulatory considerations. The structure of collected and published telecommunication data usually exceed the detail provided in the defined CPC structure.

Telecommunications service activity may be proposed as being divided into three fundamental categories:

1. Fixed-line telecommunications services (such as Integrated Services Digital Network (ISDN) and leased circuits);
2. Mobile telecommunications services (such as cellular phone services and pager services);
3. Inter-telecommunications services (the connecting services of networks between telecommunications companies).

The level of service product classification for an SPPI may often depend on the pricing method applied. When the unit value method is applied, the lowest level of service product detail is dictated by the available revenue and quantity data. Where the component pricing method is applied the structure of published service-rates will dictate the level of service product detail.

In SPPI development, it is appropriate for the product classification system to be based on the type of service provided (that is compiling a product SPPI). This is different from the ISIC industry classification system, in which outputs are categorised by the major output of each company. In the industry classification system, all the service outputs of a company are counted in one industry division, although minor output can be quite different from the output of the industry in which the company is categorised. This can cause a subsequent problem in the use of turnover data for telecommunication-service weighting provided by suppliers, which is classified to ISIC

divisions. This is becoming an increasing problem as the number and diversity of telecommunication suppliers expand together with the range of services they provide (i.e. services which are primary to some other industry such as pay t.v.).

3. Sample Design

As a preferred approach, the sample design method recommended is Probability Proportional to Size (PPS) if possible. Options for stratified sampling, using turnover as the stratification variable, may also be applied to improve efficiency of the sample through reducing variance. If telecommunication is recognised to be led by a small number of dominant suppliers, a mixture of purposive and random sampling may be considered. This could ensure that the representative and leading-company sales are always included in the sample, with the remaining companies sampled randomly.

4. Main pricing methods

The dominant business-telecommunications pricing methods that have been applied are the component pricing method[65] and unit value method. These have been found to be the most effective methods for monitoring prices within both fixed-wire and wireless industries. The unit value method has been assessed as providing the best pricing method for services dominated by usage-costs and the component pricing method (the version where weights are based on total revenues) has best application to the services dominated by costs/rates that do not vary according to usage As wireless telecommunications is a service that is often biased towards usage costs, the unit value approach is favored.

Business telecommunication companies monitor and react quickly to revisions in pricing structure and price levels undertaken by competitors. This causes pricing revision to be dynamic and diversified (often high complex) pricing formulae to be created. Business-telecom service pricing may be generally partitioned in to three categories; fixed recurring monthly charges, fixed non-recurring charges and variable usage-charges.

In the component pricing approach a set of profiles is established for typical service customers (small, medium and large companies) with service products identified and weighted. However, this approach does not easily accommodate the market changes in services offered and requires frequent revision.

The unit value method is implemented by obtaining a unit value price at the lowest level of aggregation, which is the ratio of revenues to quantity (in minutes) for a homogeneous group of products.

For *fixed* line service products, a suitable list of items could be:

Variable charges	**Fixed charges**
- Local calls	- Connection charges
- National calls	- Rental charges
- International calls	
- Calls to mobile	
- other calls	

For *mobile* service products, a suitable list of items could be:

Mobile charges

- Calls and fixed charges,
- SMS,
- Connection.

The revenue and quantity (minutes) data may be collected from the service enterprises themselves, or from industry regulators who may provide a census of data from suppliers.

5. Costs and benefits of the alternative pricing methods

Component pricing

The component pricing with *fixed service structure* ("bill method") assumes that a set of representative telephone bills and prices is available throughout the lifetime of a business

[65] There are two possibilities in applying the component pricing method. Firstly, prices may be total values of bills, in which the service structure (detailed quantity data in a bill) is held fixed. This has sometimes been called the "bill method". In the second option, bill information is also used but weights for the rates included are based on total revenues for various services rather than on a fixed quantity structure as in the first alternative. This has often been called the "rate method".

telecoms index. The bills in a base year could be used to define the set of services used in a base year and generate the weighting pattern. This approach is valid if the price changes are the only movement in the index and there is no change in the service use. The respondent would be asked to provide the price updates on the bill and the associated discount information. A disadvantage of this approach is that the use of one service on the bill may affect the discount (and hence price) of another service on the bill (particularly with bundles services) which would require informed (and unlikely) knowledge on the part of the respondent. This approach places a large burden on the survey respondent and has been shown to bias the survey response to smaller, less complex bills.

The component pricing method uses a specified list of business telecom characteristics, such as unlimited calling within an area with a given number of users. The method is appropriate as long as the transaction characteristics are fully specified and constant. The billing rate is used as the price in the index. The method requires only one entry per rate and the selection could be based on probability. The method also reduces the concern over a bias towards smaller accounts (as encountered with the version of component pricing where the service structure is held fixed). Prices are easily available because enterprises usually keep records of different rate categories and this minimises the respondent compliance burden. Reporting items on complex bills is avoided.

The use of the component pricing method may differ in its suitability for local telecommunications and long-distance telecommunications. Local telecom is sometimes based on a flat fee charge, with no usage charge. In this circumstance the method is suitable. However, in long-distance calling, the usage charge does not lend itself to using the method. A disadvantage is in this case that the method does not capture all the discounts applied and the PPI developer would need to seek an average discount for each, considered rate.

A good example of the use of component pricing for telecommunication services is given in box 3 of section 2.6.

Unit value method

The unit value method is a favoured and popular system for pricing local calls, which have a usage charge structure, long-distance calls and wireless services. The revenue of a specified service is divided by the time consumed for the service. The yielded unit value is multiplied by its base weight and aggregated within categories. In effect, the unit value method can be considered to be the component pricing method on a "per minute" basis. As with rate information, the telecommunication enterprises record the value and volume measures for their own analysis, which minimises the respondent burden of the survey.

Compared to the component pricing with fixed service structure, a benefit of the unit value method is that it generates no bias towards smaller accounts caused by respondents favouring the reporting of less complex bills. The unit value approach also offers advantage over the component pricing with revenue weights in that it captures price change when services are bundled together. Neither of the two versions of component pricing captures these price changes, when the service price varies depending on usage. Using a unit value approach allows the enterprises and NSIs to understand where users are using the service. The use of unit values allows the creation of relatively homogeneous categories, which ensure that movements in customers between rate plans remain within the category.

A disadvantage of the unit value method is that the mix of service-products in groups does not satisfy the strict requirements of a Laspeyres index. However, community opinion is that the variance of macro-average pricing would be more accurate than the bias associated with component pricing where the service structure is fixed. This assumption has yet to be proven. A unit value approach will not guarantee a pure measure of price change, but will provide an approximation. The unit value method also requires cooperation of telecommunication suppliers and/or industry regulators.

6. Quality issues

There is a community concern for business telecommunication on how and when to introduce new services and omit old services from the index. When using a base-year Laspeyres index,

introduction of a new service and weight generation can be difficult, with turnover data sometimes not available for the base year. Equally, non inclusion of new services or continuation of old services can create a bias in the index which can increase with time. The unit value method can partially reduce the need for a quality adjustment methodology as the use of average, weighted prices can accommodate migrations between services within product classes.

7. Collection of the information

The collection of survey responses may be undertaken from either a sample of individual enterprises or from a central industry regulator. When collecting from enterprises, it is recommended that an initial visit by a field officer is undertaken. This will brief the respondents and ensure appropriate initial collections. Survey responses should be assessed at each collection to detect changes in service provision specifications and to track corporate usage.

8. Specific aspects

Business telecommunication services change rapidly in their specification, with rapid migrations of corporate usage. This should require a developed SPPI to undergo frequent quality assurance to maintain its relevance.

As the business telecommunications industry (and associated type of services and pricing menu) is driven from technological change, future development of a business telecommunications SPPI should be directed to addressing the following shortlist of concerns and pricing limitations voiced from the price-index community:

- To move to re-weight the service products on a more frequent basis to capture rapid changes in service consumption,
- To research methods of capturing the price of bundled service products (with discounts) which is increasing as an industry practice to corporate customers. This will likely increase as convergence of the telecommunications and IT activity increases,
- A standard method of quality adjustment of business telecommunications would be useful to capture the improved transmission of data and speech through improved technology.

In fixed-wire services, there is a strong, current trend in the provision of corporate, broadband internet-connection services. This should be considered in a SPPI structure of telecommunications services. In wireless services a future trend is identified towards third-generation (3G) communications, which will offer the ability to transmit data at a greater rate than before and support a greater diversity of service.

9. Overview of national methods

A selection of recent and representative references is provided in the following Voorburg Group papers: [1], [2], [3].

In **Japan**, the SPPI is priced using a sample of services and actual transaction or model prices are collected. The pricing scheme captures discounts on a real-time basis (where they are applied before the release of the statistic) or retrospectively (through a revision of the SPPI series when the discount becomes later known). The telecommunication services are partitioned (at a top level) into:

- fixed telecommunication services,
- mobile telecommunication services,
- inter-telecommunication services.

In **Italy**, the business telecommunications price is collected through a Consumer Price Index (CPI) and is partitioned at a top-level into fixed-line networks and mobile networks. For both fixed-line and mobile networks, a basket of services is used, which (for each major supplier) samples the most widespread types of contract for the services offered (weighted according to the average consumption). The approach has recognised the tendency of the industry to change the contract as frequently as the price, supporting the need for quality adjustment. In the mobile market, contractual customers are identified as corporate or household. However with mobile rechargable-card services, it has not been possible to distinguish between corporate and household usage. The CPI applies annual chain-linking, allowing the annual reweighting of service activity and updating of the service structure (introducing new products and removing obsolete services when they cross a revenue threshold).

There is no discrimination between corporate and non-corporate activity.

The United States have recognised the weaknesses in the billing method and have moved to use a mixture of rate and unit-value pricing.

The UK index for business telecommunications comprises fixed line and mobile telephony services. Fixed line activity is dominated by a single service provider with other suppliers using the infrastructure of the main supplier. UK mobile services are supplied by a small number of evenly sized businesses with their own networks. Other mobile suppliers provide virtual networks by securing airtime from one of the major providers. The UK telecommunication sector has an estimated annual turnover of around £40 billion in 2001-02. In recent years, mobile markets have seen rapid growth with frequent changes to service contract conditions as well as prices.

The index is based on a unit-value method. It is compiled from the aggregation of unit-values defined as the ratio of revenue to volume for each homogeneous group of products. Turnover and volume data for the whole market is sourced from the UK communications regulator (Ofcom) providing full coverage. The unit-value approach provides a proxy estimate suitable for the telecommunications industry. In addition to minimising bias, it solves the problem of service bundles and escalating tariffs by negating the need to constantly adjust for quality.

4.9 Real estate activities with own property

1. Description of the sector (ISIC 701 / NACE 70.1)

Real estate services encompass a range of activities, including the sale, purchase and rental of commercial and residential properties.

In the UK only non-residential real estate activities (i.e. those provided to businesses only) are considered and this is reflected in the description which follows.

2. Classification aspects and scope of the survey

This group corresponds to 7020 and 7030 in ISIC Rev.3.1 and classifications 70.20 and 70.30 in NACE Rev. 1.1

This class includes the following services: Real estate agents acting as intermediaries in the selling, letting and acquisition of properties; the provision of rented accommodation (non-residential); other property management and related professional services. 'Buying and developing own real estate,' is not listed here because it does not contain a corporate element. It is, however, included within the classification.

3. Sample design

The sample is stratified by geographical region, type of property and estate agent activity.

Type of property is split into four categories:

1. Office;
2. Retail;
3. Industrial;
4. Other.

Estate agency activity is split into three categories:

1. Selling;
2. Letting;
3. Acquisition.

For each combination of geographical region, type of property and estate agent activity, data is collected on commission rates and property value indicators.

4. Main pricing methods

It is recommended that two separate price indices, each with their own pricing methodologies, are created. These two indices are:

1. Real estate agency services;
2. Letting of self-owned property.

The first should combine data on commission rates collected from real estate agents with property value indicators (i.e. the percentage fee method as described in section 2.7). Note that this requires access to reference price indices for

different classes of non-residential real estate assets such as office, industrial, retail etc. The second could be a proxy index based on rental income from the different classes of non-residential property.

Whilst for real estate agency services other pricing methods may be possible based on the pricing mechanisms which exist within the industry as described below, commission as a percentage of sale or rental value accounts for by far the greatest proportion of revenue earned within the industry (80% in the UK). Consequently use of the percentage fee method for commission based services can be expected to be representative for the industry.

Estate agents use four main pricing mechanisms when charging for their services. These should be taken into consideration when designing a survey and writing example specifications:

1. Commission (a percentage of the sale value or a percentage of the rental charges);
2. Fixed fee;
3. Incentive fee (based on a percentage fee above a specified amount);
4. Work charged on an hourly basis (for example, receivership work, court work and expert witness work).

Approximately 80 per cent of real estate agents' work is charged by applying percentage fees. However, small contracts will be charged on a fixed fee basis and some areas of professional services will be charged on an hourly basis. For rent review work, estate agents will typically receive a percentage of the savings accrued.

Property management services tend to be charged on a contract basis. Although contracts may be repeated, aspects of the contract can change leading to difficulties in the measurement of pure price changes and quality changes.

A number of factors will determine the percentage commission charged for selling property. For example, if it is thought that the property will sell relatively easily and the customer agrees on the price recommended, the rate of commission will be relatively low. Property located in prominent locations may be charged at a lower rate of commission.

Selling can occur by sole agency or joint agency. With sole agency the sole agent receives the commission. With joint agency, the commission is usually shared among the joint agents. Occasionally with joint agency, the first agent to introduce the final buyer will get the commission, but this is rare.

Letting services are typically charged by a percentage rate of the first year's rent, regardless of the number of years in the contract.

5. Costs and benefits of the alternative pricing methods

The rationale for combining commission rates with property value indicators is recognised internationally, for example, by the National Accounts Working Party's Task Force in "Price and volume measures for real estate, renting and business services". A brief extract is shown below:

Monitoring estate agents' margins only could produce misleading results, e.g. if margins remained constant at 5% say, the index would remain constant. However, if property prices are increasing then the income earned would be increasing - and so this needs monitoring too to enable a true measurement of estate agents' charges.

6. Quality issues

There are a number of quality issues that should be considered when setting up a price index for the real estate industry.

Is it necessary to collect data on commission rates?

In theory, collecting this data and combining it with information on property values, as described earlier, seems the correct thing to do. What happens in practice, however, is that commission rates change very rarely. A change in commission rates usually indicates a change in the service being provided by the estate agent. This results in a specification change or quality adjustment making measurement of the actual price change difficult.

It has been observed that changes in the index closely reflect changes in the capital value and rental value indices used in its construction. This raises the question, would capital value and rental

value indices be good enough proxies for the price index in their own right?

Are service specifications on survey forms clearly defined?

Occasionally respondents have difficulty quoting rates for agency work because they are part of a package of services provided to a client. In these cases charges for a particular service can be influenced by other charges in the same package. For example, agency work could be partly affected by valuation or consultancy work carried out at the same time. In such instances, quotes are provided for specific transactions which do not reflect the full range of business of the respondent.

Problems can be caused by respondents misinterpreting what is and what is not a representative commission rate. For example, a respondent might take an average of 10 transactions for each market sector and calculate the average commission rate for each of the selected properties. However, quarter on quarter changes could be caused by changes in the mix of properties in those samples rather than market pressures. The respondent should therefore be asked to pick out typical and specific transactions for each market sector and should report on these each quarter. For example, the commission rate for the letting of a 5,000 square foot office property in a city centre.

7. Collection of the information

For the two price indices defined in section 4, the required data can be collected via a survey or through a third-party company operating within the real estate industry. For the survey approach, the sample structure outlined in section 3 should be used.

8. Specific aspects

To truly reflect changes in the cost of real estate services, it is necessary to monitor property value as well as estate agent's commission fees. Property values vary greatly from region to region. This means, to accurately capture the change of service costs, a regionalised price index should be created.

9. Overview of national methods

In the **UK** a survey is used to collect commission rates. The sample structure used is similar to that described in section 3. Property value indicators, in the form of capital value and rental value indices, are provided by a third party data supplier, the UK Investment Property Databank (IPD). The same supplier also provides a monthly index for rental income from investment properties.

The commission rates collected by the survey are combined with the capital value or rental value indices for each of the components of the sample structure. Each component is applied a fixed weight, based on turnover figures collected in the base year, and a standard base weighted price index is created. The turnover data used for weighting is collected from respondents when they are surveyed for the first time. This gives a corporate service price index for real estate agency services.

The rental income from investment properties index provided by the IPD is used as a proxy for the letting of self-owned property corporate services price index.

The **Australian** real estate industry is divided into two main sectors: residential property and commercial/ industrial property. Each of these sectors can be broken down into two main components: property sales and property management. The real estate index is therefore composed of the four activities: sale of residential property; sale of commercial property; management of leased residential property and management of leased commercial property.

In the **USA**, the index for 'Lessors of non-residential buildings,' tracks rental payments to the owners of non-residential buildings or properties. Lessors of Non-residential Buildings (NACE 6512) are establishments primarily engaged in the provision of non-residential buildings to others for rent. Establishments in this industry own non-residential property, and lease it to others (tenants). The leasing of non-residential buildings has two parts. First, the physical space is contracted through a lease. Second, the management of the entire space consists of heating, cooling, electrical, plumbing services, maintaining the physical structure and maintenance of common areas (hallways, lobby and outdoor areas).

In Japan, real estate services are divided into four categories. The first provides rental services of real estate for residential use. The second provides rental services of real estate for non-residential use. The third category provides agent or intermediary services, such as for buying, selling, and renting real estate. The fourth concerns services related to the management of real estate.

4.10 Computer and related activities

1. Description of the sector (ISIC 72 / NACE 72)

In many countries, computer services are an increasingly important part of the total production of services. Accordingly, the national accounts have given high priority for the development of a price index for this area. At the Voorburg group meetings of 1999, 2002 and 2003, several countries presented their work for developing a price index for computer services.[66] Some of the areas of computer services presented included prepackaged software, facilities management, maintenance and repair services, system design and data processing.

Computer services are often quite complicated and uniquely adapted to the needs of the customer. Different types of services are combined in various ways and tailor-made for the customer, thus making it difficult to define the service. The computer services industry exhibits rapid changes. New enterprises are being founded as others end their activities. Moreover, mergers are common. There are also changes taking place within enterprises, often through specialisation or a broadening of activities. During times of economic decline, many enterprises concentrate on improving skills within their own organisations instead of hiring external consultants. Larger enterprise groups often have their own companies that only sell computer services to other companies in the enterprise group. These services are not usually evaluated at the market rate.

2. Classification aspects and scope of the survey

According to ISIC, International Standard Industrial Classification of All Economic Activities, Rev.3.1 code 72, computing service activities are classified as:

- 721 Hardware consultancy,
- 722 Software publishing, consultancy and supply,
- 723 Data processing,
- 724 Data base activities and online distribution of electronic content,
- 725 Maintenance and repair of office, accounting and computing machinery,
- 726 Other computer-related activities.

The ISIC makes no distinction between pre-packaged and customised software. Pre-packaged software services can furthermore be divided in to three levels: programming languages and compilers, operating systems and applications (sold as a suite or separately) and games.

It is common for provided services to be a combination of two or more of the above-mentioned categories. However, it is usually that case that small enterprises only handle data consultancy or repair and maintenance services whereas larger enterprises also offer operational services. There are usually no clear-cut definitions between the various service areas, but rather, services often consist of a complete package of services where specialists in different areas cooperate together (e.g. development and provision of customised software including query, repair and maintenance services for both the software and hardware used in operating it).

Statistics Sweden publishes four indices for computing service activities; one for 721, 723, 724 and 726 together, one for 725 and two for 722 (divided into companies publishing their own software and others).

3. Sample design

PPS sampling by turnover or number of employees is recommended. If the sample size is large enough, stratification by size and / or sub-sector of activity can also be considered. As the computer services industry changes rapidly, it is recommended to draw a new sample and update

[66] See AUS, CAN, FRA, SWE, UK and US

the weights between enterprises and service products provided on an annual basis. In order to reduce the response burden on small enterprises, it is advisable to investigate for each type of computer service activity if the sample should be drawn from all enterprises or if it is possible to make a size cut-off limit.

4. Main pricing methods

The industry Computer and related activities covers very different kinds of services. Consequently, several pricing methods are used in Sweden depending on the service.

In 722, Software publishing, consultancy and supply, the dominating pricing method is hourly charge-out rates. The companies are asked to state how much they charge their clients for one hour's work by different categories of consultants. These categories are defined in detail by working tasks and competence. If the service has not been provided during a period the companies are asked to estimate how much the price would have been.

In 721, 723, 724 and 726, Other computer services, the most common pricing method is direct use of actual transaction prices of repeated services. Hourly charge-out rates are also used to represent unique services. In the case of transaction prices for repeated services the respondents are asked to state their average price during the period for a small sample of specified services. Examples of these services are support, storage of data and supervision of servers.

There are two main pricing methodologies used for 725, Maintenance and repair of office, accounting and computing machinery: the use of actual transaction prices of repeated services and contract pricing. The respondents are asked to state their average price during the period for a couple of specified services, which are followed over time. If the service is not provided in the survey period the respondents are asked to make an estimation of what the price would have been

5. Costs and benefits of the alternative pricing methods

Data consultancy services are often unique for each customer, and are often combined with operation and maintenance services. As a result, client contracts for these services are generally complicated and detailed and thus the use of model pricing or contract pricing for these services involves a considerable burden on respondents. Therefore if model or contract pricing were used it could be feared that enterprises to a large extent would choose only small assignments for price measuring. A heavy burden on respondents can also lead to lower quality of information received as well as non-response. Estimating volumes based on virtual projects needed for model pricing is difficult. In addition, the model needs to be reviewed often, so that measured prices are up-to-date. This is especially important concerning industries that rapidly change their assortment of services. The problem with quality evaluation arises when a new contract is written, or when there is a change of customers.

Collecting data on realised turnover per hour or average hourly charge-out rates decreases the burden for the enterprises in comparison with model pricing and contract pricing. In addition, the data is often available in the standard accounting system. However, the method does not take changes in productivity into consideration, which may result in an upward bias in the price index. Dividing consultants into different categories of staff and experience levels is recommended in an attempt to minimise this bias. It is important to include the effects of discounts, and thus the use of list prices is not recommended.

Operational contracts are often very complicated and uniquely formulated for each customer. The disadvantages with contract pricing for consultancy services described above also apply to facilities management services. On the other hand, component pricing can be used by first dividing up a contract into representative components, and then measuring the prices for these components. However, since operational contracts are often priced as a package, some enterprises may have difficulty in breaking down operational contracts into detailed levels. This problem may be reduced in the future, since nowadays customers often ask for detailed price information.

6. Quality issues

When measuring *hourly charge-out rates* for consultancy services, it is important to break down the consultants into different categories of staff and experience levels. By doing so, constant level of quality of services performed can be

maintained to the greatest possible extent. Today no methods are available to measure changes in productivity per consultancy hour. Frequent dialogue with the respondents is therefore suggested to try and detect (and adjust for in the price) any reductions in the number of working hours required to perform the same types of services due to productivity improvements.

Where the method of *direct use of prices of repeated services* is used, quantity adjustment may be possible in particular where changes in the service being priced are relatively modest. For example, quality adjustment based on differences in production costs can be used when the respondent has a good understanding of input costs to provide the service (often when the core input is labour). In addition, respondents should be asked to state the price for both the new and old service when the change occurs (even if the old service price has to be estimated), to keep the possibility open for the overlap method. However both of these methods will be complicated due to the rapid technological change in this industry. That is, production functions are constantly changing making it difficult to properly evaluate the change in production costs and pricing of obsolete products for use of the overlap method can be unreliable. At this point, the Hedonic model has been rejected due to problems with model specification and lack of relevant data.

When a service has not been provided during a period targeted mean imputation is used in these indexes, in particularly for charge-out rates as there is a clear distinction between different categories of services/labour. If there is no reason to believe there is a gain using targeted mean imputation, over all mean imputation is used. When there is strong reason to believe that the prices are unchanged, for instance if the respondent expects so or if other prices from the company are unchanged, the missing price is assumed unchanged.

7. Collection of the information

By using the simplest possible methods, the quality of answers can be increased and non-response reduced. Personnel in the accounting department fill in most of the questionnaires. These people may have trouble in evaluating quality without the help of personnel who have more understanding of the operations and services performed.

8. Specific aspects

The computer industry is characterised by many rapid changes. Accordingly, it is important to closely monitor the existing indices at regular intervals. This is also true for samples and specification of services. In order to make quality adjustment of the price index based on hourly charge-out rates, methods need to be developed to measure changes in productivity per consultancy hour. This work is probably best done in close cooperation with enterprises in the industry.

9. Overview of national methods

For computer consultancy services, **Australia** uses model pricing in the form of hourly charge-out rates for different staff levels as well as price per unit of work, e.g. price per job. Model pricing is used for data processing, information storage and retrieval services as well. On the other hand for maintenance services hourly charge-out rates is used as the pricing method.

An input approach to derive a price index for computer consultancy services is used in **Canada**. The labour cost index is combined with the realised net multiplier index[67] using a geometric average to calculate a total price index. The indices are subject to revision. This input approach is used for data processing, hosting and related services. For prepackaged software, final purchase prices are collected and used for the deflation of investment expenditure of businesses in the final demand category of GDP.

In **France**, the method for measuring the price development for consultancy services is based on transaction prices per day and per qualification. In direct sales of software packages to the end user, catalogue prices (i.e. list prices) are monitored. In the case of indirect sales, the rates of discount given for retailers are monitored. For facilities management services, studies on comparing the approaches of model pricing and average price per unit of work are ongoing.

The **UK** index for computer services has undergone a number of developments since 1995. Most of the issues and challenges surrounding its

[67] The realised net multiplier is calculated from ratios of the annual revenue from contracts for informatics professional services to the expanses incurred to complete these contracts

compilation are caused by the dynamic nature of the industry which, in turn, causes difficulties with quality adjustment and outdated classifications. The UK have therefore concentrated on producing indices for the more stable elements of the industry comprising: maintenance and support of software systems/applications; IT consultancy services; and facilities management/outsourcing and data processing. This first phase of the computer services index is currently being tested and is due for publication in 2006.

As the prepackaged software products have a short life span, in the **United States** a large sample is drawn based on probability proportionate to size, representing suite and non-suite application software, computer games and system software. The prices reported for licenses are primarily based on transactions for single and multi-user licenses sold to distributors, retailers, large business etc.

4.11 Legal activities

1. Description of the sector (ISIC 7411 / NACE 74.11)

The actors of the legal services sector can be differentiated between lawyers, barristers and solicitors, notaries and patent attorneys. The lawyers, barristers and solicitors deal with advising clients in legal matters as well as disputes (consulting in non-forensic affairs, mediation) and represent them in courts of law and other legal agencies. Most of the lawyers specialize in legal activity fields such as civil, commercial, criminal, family, fiscal, insurance, labour, renting, social, traffic law etc.

Notaries are responsible for stating legal situations in the field of family, company and real estate rights such as real estate contracts, partner inscription in company registers etc.

Patent attorneys accompany their clients from the invention, over the declaration of a patent for the innovative product or services, the protection of the product or services from competitors' patents until the prolongation of a patent.

The three groups differ in their education and skills: from notaries with the most profound education in law to patent attorney with a more technological and science background and less detailed knowledge in law.

The legal activity services sector is a relatively regulated market as the state has to keep law and order for its citizens. That is the reason why the legal activity services sector is very much structured according to country specific requirements. The systems of Central European countries differ tremendously from the Anglo-Saxon legal systems. Here legal practice follows laws and acts whereas in Anglo-Saxon countries the jurisprudence is mainly focused on precedent cases. The degree of regulation is higher in these countries compared to the Anglo-Saxon countries. A principal paper on the Legal Services industry was prepared for the 2001 Voorburg group meeting (see paper). This paper was primarily based on the experiences of Australia, New Zealand, Japan and the United States and therefore may differ in parts to the description below which is based primarily on the experience of Germany.

2. Classification aspects and scope of the survey

The legal activity services are classified according to NACE 74.1 Legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consultancy; holdings. The tasks of the legal advisers are defined more specifically in sub-branch 74.11 Legal activities.

Taking the service product classification the CPC codes for these sectors are 82111/19/20 /30.

Lawyers legally represent one party's interest against another party, whether or not before courts or other judicial bodies, by or under supervision of persons who are members of the bar. They advise and represent their clients in civil cases, criminal actions or in connection with labour disputes. They do general counselling, advise their clients in legal affairs and prepare legal documents. The latter is mainly the case for notaries and patent attorneys.

Explicitly law court activities are excluded, they belong to NACE 75.23.

The scope is to generate producer price indices for the legal activity services. The objective of price statistics is to collect prices that refer to products and services which are in advance well defined

and for which a constant quality over time is more or less guaranteed. In the legal activity service sector it is difficult to find standard products or services that do not vary in quality over time and/or with the client. The legal adviser usually has to take respect of individual customer needs. A legal case hardly ever occurs again in the future with the same preconditions and rule of interpretation.

3. Sample Design

In order to gain insight into the structure of the market participants of the legal activity services sector it is recommended to contact the chambers that represent lawyers, notaries and patent attorneys. By this information the sample can be stratified according to company size and turnover or employee figures.

A random stratified sampling approach using turnover as the size variable is considered to be the most adequate method. The sample should include with certainty the large law companies who generally account for a significant share of industry revenue and are often price drivers within the market place.

4. Main pricing methods

a) Pricing mechanism

It depends on the country's legal system and degree of regulation as to which billing methods are most commonly used. The Anglo-Saxon countries usually charge fees after free price negotiations and sometimes on a success basis whereas for example in Germany the scales of fees still play an important role for price setting (though tendencies of deregulation can be revealed). In particular very specialized lawyers and those who possess a certain degree of market power are more able to set their prices in free contract negotiations.

A. Freely contracted fees

Freely contracted prices are charge-out rates, ad valorem or flat rates.

Charge-out rates (hourly rates)

The client pays an amount that equals the multiplication of a person day – usually eight hours - with the hourly rate. The rate itself can be negotiated between client and attorney. It is of interest that the hourly rate in general is independent of the legal activity field. After a long education and intensive practical experiences on the job these experts expect a certain compensation for their work irrelevant of what tasks they have to fulfil for their clients.

Many middle-sized and big companies (regarding their turnover) use a list of external commercial hourly rates for different staff levels. Smaller companies may have an average hourly rate for all employees dealing with cases in contrast to large companies where support staff are not billed separately but integrated within the general average rates for professional staff.

Ad valorem prices

In many countries, especially in the Anglo Saxon legal systems, *ad valorem* prices are found as freely negotiated prices (in the Central European countries they rather exist in the legal scales of fee). They are either a proportion of the value of a claim or the fee relates to price classes which represent the various values of claims. Therefore the client does not negotiate about the amount of the value of claim but about the proportion or factor that relates to it.

Flat rates

Flat rates that integrate all modules for a complete case are also charged - here time and the single service expenditures are not exactly calculated. The client is offered a fix base of calculation, these rates occur more often in the Anglo-Saxon countries than in the others.

Success-correlated fees

In the Anglo-Saxon countries free price negotiations are common. In these countries the lawyer's performance is more honoured than elsewhere as fees on success basis are permitted by the legislative which is not allowed in other countries.

B. Scales of fee

Scales of fees that exist in Central European countries have their origin in the legislative and regulate the market prices.

Fixed fees

In the fee scales a certain amount of fee is listed that relates to a precisely defined legal service. They apply to standard and routine matters that do not require a detailed and elaborate occupation with the case and client (e.g. signature authentication).

Ad valorem prices

This kind of fee represents the most important and the most occurring share of turnover derived from the scales of fee. The amount of fee increases stepwise. It does not rise proportionally with growing values of a claim. The proportion of the fee corresponding to the value of a claim decreases as the value of a claim rises.

In most cases the legal advisers either set charge-out rates after free price negotiations or they bill *ad valorem prices* according to the scales of fee.

b) Pricing methods

As outlined above to generate turnover in most cases the legal advisers either set charge-out rates after free price negotiations or they bill their fees according to the scales of fees. This leads to following types of pricing methods being most applicable within this industry.

A. Hourly charge-out rates

As law companies and legal advisers usually do not publish prices of their hourly rates or services these rates have to be surveyed via direct inquiry. In the questionnaires it is important to ensure that rates are obtained for all categories of staff which are billed by the firm (e.g. partners, associates, juniors etc.). It is also important to distinguish whether support staff are specifically billed or not, and if so to collect their charge-out rates too. Price relatives for each category of staff should then be weighted together based on the proportions of turnover generated by each staff category which must also be supplied by the firm[68]. This proportion of turnover by staff category should be split by the different types of legal services the company performs in accordance with the elementary aggregate structure of services products used in the compilation of the SPPI.

It is essential to verify whether the reported charge-out rates reflect actual (or approximate) transaction prices prevailing in the market within the survey period and are not simply list or reference prices. These tend to be reviewed less frequently (e.g. annually) and generally do not represent real market prices. The issue of list prices is discussed in the general part of the manual (chapter 2.4.1).

The charge-out-rate approach offers the advantage that the official statistical inquiries can be kept short and simple. However, methodological speaking hourly rates are considered as an approach less preferred than others as lawyers charge per hour independently of their performance or success in the case. Thus the output of their services is not being defined precisely which is the general requirement of price statistics.

B. Percentage fee method

The pricing mechanism of legal services may be based on a scale-of-charge system. In this case, the NSO may itself calculate the price for a given model case using the scale. A model is using criteria such as activity field, kind of claim of the client, participants in the case, value of claim, date etc. When applying the percentage fee method, resulting prices of services change over time due to changes in the scale of charge and values of claims.

The legal scales of charge as they exist in Central European countries have their origin in the legislation and regulate the market prices. They contain two types of pricing mechanisms:

Fees may be fixed, in which case they are easy to follow up by desk research. The Statistical Office has to look up updates of scales of charge and observe price developments.

More commonly, fees are *ad valorem* prices where the use of scale of charges is more difficult. These prices should be carefully analyzed before using them in a SPPI. Changes in *ad valorem* prices most often depend on changes in the values of claim. The other factor having an impact on price changes, changes in the legal scales of fees, occurs very seldom.

In practice, it is often difficult to define representative values of claim as legal cases differ from client to client and time to time.

Estimates on price changes of claims in various activity fields are based on the use of adequate reference price indices. Such a price index may be (e.g. for notaries) housing price index. Exceptionally, other reference indices may be considered to be used. The choice of the index depends on grounds for compensations that the courts generally apply in various kinds of legal cases.

[68] It is recommended to review these proportions with the firm on an annual basis and adjust aggregation weights accordingly.

Before selecting representative cases, a classification of various activities should be established. The associated weight structure is calculated based on the turnover of all companies of the industry. Thus, the resulting weight structure can be relatively detailed. The weighting pattern is then used to calculate price changes by applying a Laspeyres index formula.

Regarding the patent attorneys there are often difficulties to produce a weighting pattern for various activity fields. The patent attorney usually takes care of the client throughout the product life-time and a distinction between the different patent phases is not done by the patent office – neither in their bills nor other documents – and therefore the activity fields are not easy to identify.

C. Model pricing

In this case the respondent is asked to define the activities involved in a representative legal service they perform (e.g. obtaining an injunction) and to reprice this service in each subsequent reporting period. Unlike in the percentage fee method, no fee scale is available to be used in the price estimation but the price is assumed to be based on negotiation between lawyer and client. Examples of model pricing specifications for the legal services industry can be found in Attachment 2 of the aforementioned 2001 Voorburg group paper (see paper).

5. Quality issues

Generally speaking quality changes in the legal sector can hardly be revealed. Technological progress in the information and communication sector (e.g. PC-equipment, velocity of data transfer) has an impact on the work of lawyers and notaries, but not to such an extent that technological progress would lead to a new input/output relationship.

On the contrary, legislation is of a very complex nature. Ongoing changes to complex legal systems may well outbalance any technological progress or quality changes in legal works. Their measurement is difficult to conduct.

Concerning charge-out rates productivity progress is a factor which may influence the service and product quality but this is also difficult to measure.

Model cases should be revised over time to a certain extent which does not neglect the comparability of data.

6. Collection of information and specification of the services

Charge-out rates can easily be answered by the respondents via a simple and short questionnaire. However, this target group is especially reluctant to give away their hourly rates.

The percentage fee method based on applying a model claim to a scale of charge system provides the advantage that the fees can be followed up by the Statistical Office through simple reference to publicly available information on the scales of fee. In the beginning experts and chambers have to invest time and efforts to set the model claims but after this process is complete these experts only need to be consulted on a less frequent basis (e.g. annually) to review the representativeness of the models.

7. Specific aspects

Exports are generally not relevant for legal services activities as he legal system is country specific. For international cases the lawyer collaborates with corresponding partner law companies.

The timing which prices of which period should be included in the analyses for the SPPI is an important question. Legal cases often last several survey periods, sometimes taking more than a year. In this situation due attention should be paid that the accrual principle is followed, as closely as possible, in the index compilation.

8. Overview of national methods

The **Australian** Bureau of Statistics has been publishing an SPPI in the area of legal activity services since 2000. The main pricing method used is the monitoring of hourly charge-out rates.

Austria started its work for the construction of an SPPI in the legal activity services sector in December 2002.

In **Germany** work on the SPPI construction started in April 2003. The pilot study has been finalized in December 2004. Nevertheless some

fine-tuning of the methodological approach is still necessary.

Since 2004 there are tendencies that the German legal market becomes more and more deregulated (this does not apply to the notaries). In non-forensic cases law not only allows but also supports to run free price negotiations.

The most important fees of legal advisors in Germany can be differentiated between charge-out rates (hourly rates) for the area of free price negotiations and fees on the basis of the legal scales of charge for the regulated market area in forensic cases - here *ad valorem* prices[69] represent the most relevant fee type relating to turnover figures.

In **Japan** the legal services industry is divided into services related to cases and disputes, to intellectual property rights and to legal documentation and certification. Hourly or monthly rates are surveyed, for patent services registration and application fees are observed. The index for legal activity services has been published since 1985.

New Zealand's legal activity services sector is structured by a mixture of large and smaller businesses. It is partly regulated. Nevertheless, the price finding processes run freely and are due to contract negotiations between client and the law company. Scales of fees were abolished a long time ago. Statistics NZ use two approaches to develop a legal activity services SPPI: model pricing and charge-out rates. Additionally the published SPPI (since 1994) is distinguished by the compilation of sub-indices for corporate and personal/private legal services.

In **Sweden** price collection has been carried out since the first quarter of 2003. Price information is collected on the average invoiced hourly rate for the following categories of staff: part owner, associate 0-2, 3-5 and 6-9 years professional experience. The index applies to the price development of legal services for enterprises.

Norway has conducted a feasibility study within this industry. Based on this study it was decided to collect average charge-out rates for five types of clients: foreign clients, private clients/households, business clients, public administration and cases paid by the public, e.g. criminal cases. For each type of client prices will be collected for four staff-categories - partners, senior associate/lawyer, junior associate and any other judicial staff. To estimate weights, total turnover for each type of client will be collected every second year through the Structural Business Statistics (Annex 8). The respondents are asked to break down this turnover by staff-category.

In the USA the US Bureau of Labor Statistics has been publishing SPPIs for a range of legal activity services since 1995. Here the law companies are differentiated between firms with a national practice, firms with a regional practice, specialty or "boutique" firms, and local practices.

In the USA the market is generally deregulated and fees are often calculated on a success basis for certain types of cases (e.g. litigation). Usually the business relationship is based on freely negotiated contracts between the law company and the client.

The standard ways to pay for basic legal services include hourly fees (the most common arrangement), flat or project fees, retainers, contingency fees, percentage fees, and a combination of two or more of those methods. Hourly rates are adjusted almost yearly and take into consideration the market development and cost of living.

The Bureau of Labor Statistics collects both fixed fees (for real estate transactions, simple divorces, wills) and hourly rates.

4.12 Accounting, bookkeeping and auditing activities; tax consultancy

1. Description of the sector (ISIC 7412 / NACE 74.12)

The different services in this sector include Accounting, bookkeeping, auditing services and tax consultancy. The large firms concentrate more on auditing and tax consultancy while the smaller firms focus more on accounting and bookkeeping.

The Voorburg Group prepared a paper on Accounting services for the September 2001 meeting in Sweden. Whilst this paper looked at the situation in seven different countries the main

[69] *Ad valorem* prices correlate positively to the amount of claim of the legal case (in Germany the legal scale of fee provides tables that list the amount of fee for the corresponding value of claim – the correlation between fee and value of claim is not necessarily proportional).

elements of the paper referred to the approach used in Canada. (paper) A paper on the situation in Israel was presented in the Voorburg Group meeting, 2004. (paper)

In Ireland there are approximately 1,700 accountancy enterprises, employing almost 12,000 staff with a turnover of almost €1 billion. There are 4 main players in the industry.

2. Classification aspects and scope of the survey

This group corresponds to 7412 in ISIC Rev.3 and Class 74.12 in NACE Rev. 1.

The class includes:

- Recording of commercial transactions from businesses or others,
- Preparation of financial accounts, examination of such accounts and certification of their accuracy,
- Preparation of personal and business income tax returns,
- Advisory activities and representation (other than legal representation) on behalf of clients before tax authorities.

The class excludes:

- Management consultancy such as design of accounting systems, cost accounting programmes, budgetary and control procedures,
- Bill collecting.

3. Sample design

For Ireland, sampling of companies is based on the Business Register and the Annual Services Inquiry. It is necessary to include a stratification of small and large firms in the sample due to the different nature of the services provided by the different size of firm. Accountancy and bookkeeping services are mainly carried by small to medium sized firms while auditing and tax consultancy are undertaken by larger companies.

Firms are asked to state the percentage revenue generated by each of the following:

- Auditing Services,
- Tax Consultancy,
- Accountancy,
- Bookkeeping,
- Other.

The above categories could be considered as the major service products within this industry and could define the basis of a weighting structure for the index.

4. Main pricing methods

There are two main methods used for compiling an SSPI in this sector, model pricing and the use of hourly charge-out rates.

Model pricing

This involves keeping track of a model contract. Companies are asked to select a representative contract/model and quote in each quarter what their price would be to undertake that project if it were up for renewal in that quarter. Once companies have selected a model the specifications of that model should remain constant. A contract can be either based on a contract signed in the past or based on a virtual contract. This contract/model should be representative of a significant portion of turnover.

When pricing the model the respondents are asked to take account of the following:

- Labour costs (staff by grade and number of hours),
- Overheads,
- Gross Profit Margin (the representative margin that would apply in current competitive climate).

Respondents are asked to explain the reasons for price changes and if variation in the model occurs (e.g. if less hours are required to provide the same service).

Hourly charge-out rates

The use of hourly charge-out rates is a common pricing method used in this sector due to the ease of data collection and low respondent burden. Clients are usually charged on the basis of hours worked per person involved thus data required to complete the price questionnaire is easily obtainable. In using hourly charge-out rates effort should be made to ensure that data collection is

split by the most detailed classification of staff grade and experience possible. Ultimately this will depend on data availability within the firm as weights are required to combine the hourly charge-out rates by staff classification. These weights should represent the proportion of annual turnover obtained by the company by classification grade within the service category being surveyed.

Prices for hourly charge-out rates should represent transaction prices. Often companies have list rates which are updated once a year and if these are used it is important to obtain an estimate of the discount (or premium) which would apply to these list rates for the survey period. This discount will usually be dependent on the state of the market. Another alternative is to obtain prices based on average revenue received per hour billed by staff classification within the survey period. This is often referred to as the 'realised hourly rate' and is a common form of price measurement for many countries in this industry (e.g. Sweden, Australia, France, Germany).

5. Costs and benefits of the alternative pricing methods

With model pricing, changes in price for the same product are easily tracked from quarter to quarter. However, it may be time consuming for the respondent as the specifications of each model need to be re-costed for each pricing period. Therefore this method risks that the respondent will not take the exercise seriously which can jeopardise the quality of data collected. In addition, it is important that the respondent reviews the number of input hours required to perform the same service output. If this is assumed to be the same then this method will not pick up the impact of possible improvement in productivity. Hourly rates are often easy to collect but generally bare no relationship to the actual output services provided to clients. This means that improvements in productivity will not be captured which implies that an SPPI constructed using this method may be upwardly biased in the longer term.

6. Quality issues

When using model pricing it is essential to ensure that the model remains representative and its repricing is taken seriously by the respondent. If prices remain flat for several periods, particularly if other specifications based on charge-out rates show rising prices, then the respondent should be queried. If the reported price for hourly charge-out rates only changes once a year then the firm is most likely reporting list prices which are not acceptable for use in the index.

7. Collection of the information

The most frequent way of collecting data is by survey (sending a questionnaire to each respondent) by post or email. Most of the prices for large accounting contracts change annually, for example auditing. Also, hourly charge-out rates (list rates) are usually updated annually. Where realised hourly rates are used (i.e. revenue divided by the number of hours billed) there may be some difficulty in obtaining the required data for the current survey period and thus input to indexes may need to be lagged.

8. Specific aspects

In the future, analysts expect more mergers of giants of the industry such as between Price Waterhouse and Coopers and Lybrand in 1998. This may make it more difficult to survey these firms and risks that domestic services may be performed offshore. In addition, new services are evolving related to the development of the Internet and it will be important to monitor these activities to see if there significance in terms of market share warrants price collection. This is related to the constant increase in the range of advisory services and non-traditional accounting services becoming available in the market.

9. Overview of national methods

In **Canada**, it is considered that two kinds of information are needed in building a price index for accounting services: Revenue (total and distributed by category of services) and Contract information (price, service provided and other details).

Respondent companies pick service contracts and monitor these. Few contracts remain identical for year to year, so respondents are asked to indicate for each representative contract, how much of the price variation is due to change in service and how much is due to price change. (This is an improvement over the previous approach where

average weekly earnings were used as a price deflator for estimating production at constant prices in the Canadian system of national accounts).

In **Australia** accounting firms derive most of their revenue from tax services. Most firms agree that the pricing model of staff level, times the charge out rates, times the hours billed, times the recovery rate is an appropriate model for their services. In many cases real price change can still be measured using other information (e.g. monitoring contracts) which has to be identified on a case by case basis. Timing issues arise when staff time sheets within an accounting firm are not submitted until the next quarter.

In **Sweden** price collection is carried out quarterly and the prices are the average invoiced (actually paid) price per debited hour of the range of staff levels / qualifications for different categories of services. The services are chosen by the companies themselves and each company are also asked to annually update weights between their services. In Sweden auditing and bookkeeping are split into two indices that are published quarterly. Tax consultancy is no longer measured, mainly because it was difficult to separate it from other consultancy and legal services. The weight is 43 % auditing, 39 % accountancy and bookkeeping services and 13 % tax consultancy for companies within Class 74.12 in NACE Rev. 1 in Sweden.

In **France**, the survey on Prices for accounting services started in 1996. Pricing methods changed in 2002 to the use of a charge-out rate method. Prices are list prices (price per day and per qualification) and a kind of a rate of discount (average rate of discount for the firm). The list charge-out rates per qualification are multiplied by the rate of discount to end up to a kind of realised charge-out rates per qualification. However, the prices are not exactly realized prices per qualification because it is impossible to collect the discount rates per qualification. For the smallest firms, the "contract pricing" method can be used for some sub-branches. In this industry, a survey is organised only once a year. A quarterly survey was also tried but it failed. For the firms, monitoring price evolution quarterly has no sense because services are provided at annual basis.

In **Japan**, two items of accounting service are compiled in the Corporate Service Price Index (CSPI). They are certified public accountant services and licensed tax accountant services. Actual transaction prices are surveyed to compile the index for each item. Certified public accountant services are covered using monthly or annual fee for auditing annual accounting records with specified clients from the same accountants to fix the quality of services. Licensed tax accountant services include two types of services. The first one is fee for services, which combine bookkeeping with a set of preparation and review of tax returns. The second is a monthly fee for advisory services. Both types of service are surveyed with specified clients from the same accountants to fix the quality of services.

In **New Zealand** prices are collected for both Intermediate and Senior Accountants from a wide range of firms throughout New Zealand. The questionnaire specifies for each the charge-out rate: Title of the position, Qualification required and Number of year's experience.

In the **UK** the Fee income method and model pricing are used. Contract charges may be easier to measure in small firms rather than large firms, as in small firms' services may be more repetitive. It was envisaged that the survey would recommence in 2000 on a model price collection basis for medium and smaller firms and on a fee income method by professional grades of workers for larger companies.

In the **USA**, for accounting, auditing and bookkeeping the following price determining characteristics apply: labour hours required, degree of professional expertise, season, type of buyer, size of buyer and recurring vs. non-recurring service.

In the **Netherlands**, following a pilot study, it was decided that it was impossible for firms to do model pricing each year. Hourly charge-out rates are considered the best measure of price change for the service.

In **Germany** separate SPPIs for auditing and tax consultancy services (including bookkeeping, accountancy) have been calculated since 2004. For companies with main activity in the auditing sector the standard pricing method is time based using realised hourly rates, differentiated by four degrees of professional expertise and three activity fields (auditing, tax consultancy and management services). Another pricing method used in specific cases is transaction prices of repeated services.

Companies with main activity in the tax consultancy sector are smaller or medium size firms. Here the percentage fee method, based on a legally set scale of charges is used. This scale of charge system determines prices for almost 90% of turnover in the tax consultancy sector. No survey is needed but the Federal Statistical Office calculates the prices for an elaborate set of model cases by desk research. The model cases are defined by criteria such as activity field and differences in gross value used in the calculation of tax liability. Detailed data from tax statistics and additional information from an inquiry at tax consultancy firms served as an input for the development of the model cases. The prices are calculated taking into account changes in the scale-of-charges system and increases or decreases in the gross value over time.

Companies in the auditing sector and in the tax consultancy sector adjust their prices only once a year. The price collection/calculation therefore takes place once a year depending on the respondents' date of price adjustment.

4.13 Market research and public opinion polling

1. Description of the sector (ISIC 7413 / NACE 74.13)

Market Research involves the systematic data collection and analysis of a target market, competition and/or environment with the aim of increased understanding. This analysis helps to support and guide business decisions. Market research is a process of gathering information rather than selling a product.

Market research takes on a number of forms and structures depending on the business need of the customer. Traditional elements such as telephone and face to face interviews are still employed by Market Research organisations. In addition to this, new methods are being employed that use up-to-date technology. Examples of these include; Television Panels, Internet tracking and e-forums.

2. Classification aspects and scope of the survey

This group corresponds to 7413 in ISIC Rev.3.I and Class 74.13 in NACE Rev.1.1.

This class includes:

- Investigation into market potential, acceptance and familiarity of products and buying habits of consumers for the purpose of sales promotion and development of new products, including statistical analyses of the results,
- Investigation into collective opinions of the public about political, economic and social issues and statistical analysis thereof.

This class excludes:

- Research and Development activities classified under ISIC 731 and 732.

3. Sample design

Sampling of businesses is generally conducted by utilising national business registers, although this information may be supplemented with membership lists from market research trade associations. It is advisable to use a stratified sampling scheme using either employee numbers or turnover to form strata. Larger businesses have more scope for conducting extensive research with the latest technology such as television program tracking boxes. Smaller businesses concentrate their services on traditional market research methods such as telephone and face to face interviews.

The weighting structure should be generated by establishing a breakdown of revenue within the market research sector. Suggested categories are as follows:

- Group Discussion,
- Tracking Study,
- Hall Test,
- Other Interview, Attitude and Survey Work,
- Other Market Research.

4. Main pricing methods

Model Pricing

Businesses should be asked to select a representative contract/model according to their provision of market research products. Businesses should be surveyed and asked to provide a quote

for the contract, as if it were up for renewal. Once selected, models should be kept as consistent as possible. Contracts could be based either on real examples or hypothetical ones - and should represent a significant proportion of business turnover.

When quoting prices, respondents should take account of the following:

- Staff, travel and subsistence costs,
- Method costs and type (e.g. telephone interviewing),
- Hours involved in analysing and producing final products,
- Number and length of interviews or number of respondents,
- Additional outputs (e.g. presentations).

Large and uncharacteristic price changes require explanation from the respondents. Respondents should provide justification for varying models/contracts.

5. Costs and benefits of the alternative pricing methods

The use of model based pricing reflects the way pricing mechanisms are used within the industry itself. Model pricing for market research is well defined. It has the benefit of being relatively simple to price whilst being sophisticated enough to represent a realistic product. For these reasons model pricing is the preferred methodology for use in the market research industry.

The model pricing methodology necessitates close monitoring to make sure respondents are able to provide consistent and representative price quotes for each survey period, and to pick up on any changes in service delivery in order to update the model as promptly as possible. Whilst this process is labour intensive, the benefits of model pricing are deemed significant enough to outweigh other methodologies, such as charge out rates and specification pricing. These alternative solutions, whilst easy to maintain both in terms of costs and complexity, do not, arguably, yield sufficient representativeness.

The main disadvantage of collecting hourly charge out rates is that the methodology fails to capture other variables that impact on pricing within the industry. Whilst obtaining information on staff level, experience, hours of work and role within each project is relatively straightforward, a change in an indirect variable such as the price of telecommunication costs for telephone interviewing causes difficulties. In this case, the price changes within the industry would not be captured as charge out rates would remain constant.

6. Quality issues

Quality problems arise when model prices become outdated and are therefore no longer representative of normal practice within the industry. This is particularly apparent in the market research industry where the dynamic nature of technology surrounding the industry can lead to improvements in quality at a cheaper price. It is important that national statistical institutes ensure that models remain relevant by monitoring business practices within the market research industry and keeping in regular contact with respondents. This enables the timely replacement of outdated models with up-to-date specifications.

7. Collection of the information

Information is typically collected on a quarterly basis via postal questionnaire using contact information from national registers or trade association membership lists.

8. Specific aspects

One of the major challenges in the market research industry is the apparent reporting gap between actual transaction prices and those derived from charge out rates. Every client and project combination is unique. Discounting does not seem to be applied on an average basis but tends to depend on the importance of the client and the financial value of the project.

Other issues facing the industry include: the off-shoring of market research call centres to countries with lower labour costs; the dominance of telemarketing having a negative effect on response rates as the market becomes saturated; the rise of web-based research and fall of mail-based research.

9. Overview of national methods

In **Australia**, judgement sampling is used to collect prices in the market research industry. This method is deemed more economical and practical than the basket of goods approach which requires regular item replacement. The ABS aims to measure changes in the price charged for market research services by looking at the most representative activities by turnover. It attempts to capture the most competitive commercial rates through the use of model pricing, specification pricing, and hourly charge out rates. Model pricing is the most used method and can be applied in a number of different ways. For example, the respondent may (1) price a project they have completed in the past as though it were being undertaken in the current pricing period, (2) price an entirely hypothetical project, or (3) apply some combination of the two in order to accurately reflect the market. Direct use of prices of repeated services is used for more general forms of market research were standardised services exist, and hourly charge-out rates are used only when the provider is unable to price the actual service.

In **Germany**, stratified sampling is used to collect prices in the market research industry, which is split into primary and secondary research. The official business register is used to identify all units in the survey population according to their size by turnover. All larger businesses and a sample of smaller businesses are surveyed. The main pricing methods used are the charge out rate and unit value approaches. A third method of component modelling is used in the area of on-line research.

In **Japan**, the market research industry is split into regular market surveys and ad hoc market surveys. An example of a regular market survey might be a repeat internet survey whilst an example of an ad hoc survey might be a face to face interview with fixed quota and variables. The two main pricing methods used are direct use of services (including charge out rates) and the unit value approach.

4.14 Business and management consultancy activities

1. Description of the sector (ISIC 7414 / NACE 74.14)

The Business and management consulting industry is made up of two very different sub-branches: management consulting services, on the one hand, and public relations services on the other. In France, the weight of these two sub-branches is approximately 90% (management consulting services) and 10% (public relations services), respectively. Public relations services are far less developed in France than in the United States or United Kingdom, for example.

Management consulting services consists of a wide range of activities: business strategy studies and advice, financial consulting, auditing of marketing functions and proposal for improvement, auditing and proposals related to the organisation of the staff, studies to improve productivity for example.

Due to the increasing overlap between management consulting and IT, one of the main difficulties is drawing a clear distinction between management consulting and IT. This problem is found mainly in large companies, which often refer to "management consulting in the broad sense", including IT consulting.

Public relations services provide support for a company in its relations with different areas of the public. This may involve promoting the company's products, promoting the company itself (internally or externally) or its brand-name, and promotional work with the company's clients. In order to fulfil its mission, a public relations consulting agency must handle relations with all partners and networks, such as: the press, in particular the financial press; unions; public authorities; networks that shape opinion in general.

2. Classification aspects and scope of the survey

In CPC, group 831 includes "management consulting services" (class 8311) and "business consulting services" (class 8312: public relations services and other business consulting services).

Within management consulting services, it is possible to identify the following sub-classes:

- strategy consulting (general management consulting services) ,
- financial management consulting services,
- human resource management consulting services,
- marketing management consulting services,
- human resource management consulting services,
- production management consulting services,
- other management consulting services.

Some enterprises specialise in "resources coordination and management services" for the preparation, implementation or completion of a project on behalf of a client (for example cost control, forecasting of expenditure, quality control). This kind of activity is classified in *other management consulting services* in France. For more details, refer to the UN classification register [14].

3. Sample design

The identification of a sample is a complex phase in management consulting services. Use of classic sources (e.g. such as the business register) is difficult in France for two main reasons. Firstly, many companies work only for subsidiaries within the same group and prices are not linked with market prices in some cases. Furthermore, many companies are classified as consultants since they consider this to be a more "prestigious" field. In practice, they do very little if any consulting. They may in particular operate in the field of IT services, stocks and shares portfolio management or estate agency management. As a result, official sources of statistics include many more consulting companies than those counted by other organisations such as professional associations. In order to identify a relevant sample, it is therefore important to combine the use of sources from official statistics with other information available from professional associations.

4. Main pricing methods

a) Pricing mechanism

The fixed price is a fairly classical pricing mechanism for labour based services activities and is most typical in this industry. In order to calculate the price of a service, the consultant company uses a cost analysis for each category of staff, e.g. multiplies unit cost by the estimated time spent on the project. This gives the cost of the project to which the consultancy company applies a target profit margin. The price finally proposed to the client will be negotiated, which roughly amounts to negotiating the consulting company's profit margin. Some companies may charge a risk coefficient to take into account the uncertain nature of the time spent estimates. Finally, a large number of companies use catalogue-type prices according to qualifications in order to set their fixed prices.

Invoicing on a time spent basis is clearly the minority. This may relate in some cases to the provision of staff, at the client company's premises. Clients are increasingly asking for fixed price invoicing. Fixed price invoicing provides greater security to the client than invoicing on time spent basis, which can "get out of control".

For major clients, **the referencing system** is used. The purchasing departments of major groups are pushing for this system: it involves defining daily rates according to qualifications and a system of discounts for large volumes. When the consultancy company uses this system, the client can call on it for a given project. Prices charged are those defined in the referencing system. In practice, prices can however be renegotiated.

Although still marginal, the existence of **success fees** is growing, particularly when the client is in manufacturing industry. In this case, part of the price is dependent on the consultancy service provided. For example, a consultancy company may put forward proposals in order to improve productivity. Part of the price may depend on how productivity changes, once the recommendations have been implemented.

Some sizeable enterprises specialise in company merger and takeover consulting. This involves a certain type of financial advice. The way prices are set in this case is very specific: a **percentage** is applied to the sums involved in the merger-takeover. This percentage depends on the size of

the operation, its complexity and negotiations with the client.

As far as public relations services is concerned, **annual contracts** may be signed with regular clients. Invoices are issued on a fixed price basis with an estimate of the time spent at the start of the year. Even for regular clients, it appears that services provided change from one year to another, which makes it difficult to monitor contracts over time. A special kind of pricing mechanism is the invoicing system that involves a starting price (a lump sum of 30 000 euros in this example), which applies even if the firm spends very little time on the matter. This starting price is evaluated against the service provided in a complicated way. If a lot of time is spent on the matter, an invoice is issued on a 'time-spent' basis in addition to the starting sum/price.

b) Pricing methods

Pricing based on working time

In accordance with the price setting and operating method for the consultancy profession, it appears that monitoring **average charges according to qualifications** is relevant and possible as staff in these industry generally complete time sheets of their billable hours. This can lead to the use of a range of pricing methods based principally on working time the simplest being the monitoring of average unit (e.g. hourly, daily) charges per qualification at an aggregate (e.g. firm) level.

Even when time sheets are completed, the business may very well not calculate average charges according to qualifications on an aggregated basis (but only on a contract-client basis). If the company has time sheets, without aggregating the results recorded, it is possible to monitor average charges according to qualifications by selecting certain client contracts. It is therefore necessary to select a sample of client contracts (giving preference to regular clients) and within each client contract, monitor average charges according to qualifications.

An alternative approach could be to monitor **costs for a number of qualifications and the average margin** over a quarter. It is possible to estimate average charges according to qualifications by applying the margin to costs. This method is still relevant, but less so than direct monitoring of the average charge according to qualifications since it uses a more aggregated approach. Nevertheless, it can be used to approximate rates actually charged in preference to catalogue type rates.

Another alternative approach is to approximate prices from the **turnover per head, corrected for variations in activity rates**. Ideally, this involves considering: turnover excluding subcontractors, number of productive staff on a full-time equivalent basis and the activity rate. The activity rate is an indicator widely monitored within the profession. In view of its highly aggregated nature, this method is not to be preferred over the previous two. It does however look at market prices, unlike catalogue type rates. For this approach to be relevant, the qualifications pyramid must remain stable over time. This approach may also be used in public relations consulting services, replacing turnover with the gross margin. In fact, this method may often be one of the only options for public relations services because for this activity it is not common for staff to keep time sheets, thus excluding methods which follow costs / charges per qualification.

Note that when applying time-based methods for service contracts covering several survey periods, payments do not necessarily correspond to actual service provision in each period. For example, with an annual contract, the client may pay a fixed amount every month (total for the annual contract divided by 12) although less services are provided during holiday periods. However, this situation does not suggest that prices are fluctuating but the periodical payments are based on cash rather than follow the accrual principle. Differences between the pattern of payments and actual service provision should not be reflected in the SPPI.

Model pricing

Considering the unique nature of the services provided, the model pricing approach should be possible in theory. As in other branches, care must be taken to ensure that prices reflect the prevailing market situation. Therefore one can, for example, ask the company for its average rate of margin for the quarter which will be applied to the total cost for the "fictitious" project (broken down by cost line).

5. Costs and benefits of the alternative pricing methods

There are two classic pitfalls that have to be avoided: catalogue type price monitoring and monitoring charges for all qualifications considered as a whole (this does not take into account the changes occurring within the structure of the work force). It appears that monitoring **average charges for all qualifications** considered as a whole poses less of a problem than in IT departments. According to businesses, it appears that the breakdown by qualification remains relatively stable in time. That is, for management consulting services, there is no general increase in qualifications, contrary to what can be seen in IT consulting in particular. Some large companies even have a target qualification pyramid (stable over time), which they endeavour to achieve through staff losses and recruitment.

6. Quality issues

Two problems remain in relation to the monitoring of average rates according to qualifications. Firstly, **changes in productivity** within each qualification group are not taken into account. Secondly, average rates according to qualifications are calculated on the basis of time actually spent (from time sheets) and not from time estimates (as therefore invoiced) in the context of the initial fixed charge which determined the price.

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with professional organisation and enterprises (particularly the most important ones) prices can be collected via internet or by post.

8. Specific aspects

In general, time sheets are not completed within the *public relations consulting profession*. In this profession, there is no link between time spent and charge (see the typical case of crisis reporting). This aspect is very similar to that observed in advertising agencies. Nevertheless, in response to pressures from clients and given the tense economic situation, a number of companies in France have informed that in 2004 they were going to set up more effective management tools which would allow them to monitor average charges according to qualifications.

9. Overview of national methods

The OECD inventory (at the end of 2005) mentions that Australia, Denmark, Finland, France, Germany, New Zealand, Norway and US have experience in this area or the index is under development. At the last Voorburg Group meeting in Helsinki (September 2005), four of these countries (Australia, France, Germany and New Zealand) prepared a paper on this industry.[70]

In regards to the scope, one can underline that IT consultancy is not included except in Germany where IT related activities are included if they are a part of general management consultancy. The main difficulty on the scope is to clearly define the borderline between IT consultancy and management consultancy. For pricing methods, charge-out rate is widely used in Australia, New Zealand, Germany and France. Nevertheless, it is not clear whether the word "charge-out rate" means the same in these countries. France, Germany and US use "realised charge-out rate", which in general means that an average of rates from several contracts based on time actually spent and revenue received is calculated. Australia uses "bill rate and a percentage of realised rate". Of course with the charge-out rate method, the evolution of productivity of labour force is not taken into account.

The model pricing method is used in Germany and US. An estimated price is calculated for an "estimated contract" (virtual one) or for an "actual contract".

[70] See the papers AUS, FRA, GER, NZL

4.15 Architectural and engineering activities and related technical consultancy

1. Description of the sector (ISIC 7421 / NACE 74.2)

Architectural and engineering activities and related technical consultancy form a sizable part of business services. They encompass a wide variety of services such as artistic designs, feasibility studies, and management of construction projects. The services range over different fields, from buildings to equipment and infrastructure and may be as small as the compilation of a small environmental report and as large as the construction of a high-speed railway through different countries. Additionally, the corporate cultures can vary from artistic in architecture to academic in high-tech firms and down-to-earth in project management. All these services have a high level of professionalism in common and like many business services are generally custom made. Engineering and architecture have a strong influence on the important sector of construction.

Part of the output of architects and engineering is included in gross fixed capital formation in national accounts. The average contribution to GDP of architects and engineering of six EU countries was 0.9% (total final demand minus imports)[71].

The Voorburg Group prepared a comprehensive Principal Paper on engineering services in 2002 including the approaches of seven countries[72].

2. Classification aspects and scope of the survey

The United Nations' ISIC discerns the following class:

7421 Architectural and engineering activities and related technical consultancy

The United Nations' **CPC** recognises the following product categories:

83210 Architectural services

83211 Architectural advisory and pre-design services

83212 Architectural design and contract administration services

83219 Other architectural services

83220 Urban planning and landscape architectural services

83221 Urban planning services

83222 Landscape architectural services

833 Engineering services

8331 Integrated engineering services

8332 Project management services concerning construction

8333 Engineering advisory and pre-design services

8334 Engineering design services

8335 Engineering services during the construction and installation phase

8339 Other engineering services

Every class (four-digit level) in group 833 is split into the following subclasses (five-digit level):

- for buildings,
- for civil engineering works,
- for industrial plant and processes,
- for other projects.

For instance, 83333 is Engineering advisory and pre-design services for industrial plant and processes.

The EU version of the ISIC, the **NACE**, contains the following class:

74.20 Architectural and engineering activities and related technical consultancy

The European Classification of Products by Activity, **CPA**, which is derived from the NACE, splits Architectural and engineering activities and

[71] Report of the Eurostat task force on Price and Volume Measures for Real Estate, Renting and Business Services The percentages of the six countries ranged from 0,5 to 1,3 (1995)

[72] The countries that contributed to the Principal paper are United States of America, Australia, Canada, France, the Netherlands, New Zealand and Sweden A Norwegian paper in 2000 detailed a hedonic-like approach to PPI compilation for both architecture and engineering services, but this approach has been abandoned since See paper

related technical consultancy at the fifth and sixth digit:

74.20.10 Plans and drawings for architectural, engineering, etc. purposes

74.20.21 Advisory and pre-design architectural services

74.20.22 Architectural design services

74.20.23 Other architectural services

This subcategory includes all other services requiring the expertise of architects, such as:

- preparation of promotional material and presentations,
- preparation of as-built drawings.

74.20.31 Technical advisory and consultative services

74.20.32 Engineering design services for the construction of foundations and building structures

74.20.33 Engineering design services for mechanical and electrical installations for buildings

74.20.34 Engineering design services for the construction of civil engineering works

74.20.35 Engineering design services for industrial process and production

74.20.36 Engineering design services n.e.c.

74.20.37 Other engineering services

74.20.40 Integrated engineering services for turnkey projects

74.20.51 Urban planning services

74.20.52 Landscape architectural services

74.20.60 Project management services related to constructions and civil engineering works

74.20.71 Geological, geophysical and other scientific prospecting services

This subcategory includes geological, geophysical, geochemical and other scientific consulting services relating to the location of mineral deposits, oil and gas and ground water.

74.20.72 Subsurface surveying services

74.20.73 Surface surveying services

74.20.74 Map making services

74.20.75 Technical consultancy services other than engineering consultancy

This subcategory includes mineralogist, petrologist, geochemist and environmental geologist services.

The industry makes a sharp distinction between engineering services, architecture and 'related technical consultancy'. Most international classifications (see above) make this distinction at a low level only. It may therefore not be possible to make the split in the Business Register or business turnover surveys. The price survey could mix these industries, but there are potential differences between them in price setting and optimal price survey methodology. It is therefore recommended to split them into three groups. No country has started PPI development yet for 'Related technical consultancy'. This industry could either be disregarded as a small part of the industry, be included in the PPI for engineering services or a separate survey could be launched. Similarly, even architecture could be disregarded at the start as it is a smaller industry than engineering, i.e. one could use the engineering PPI as a first rough approximation for the whole industry. This may be specially the case if Architectural and engineering activities and related technical consultancy are one commodity group in the Input/Output tables of the national accounts, as an aggregate PPI would probably be used as a deflator anyway. As engineering is both the main industry within this group and as there is quite some international experience in engineering services PPIs but not in architecture or 'related technical consultancy', this paper focuses mostly on engineering services.

There is no product classification for the industry that is used widely for turnover statistics or PPIs. As witnessed by the CPC, engineering activities can be split up according to different criteria: (1) according to field (construction, technical installations, public space, traffic & transport, infrastructure, environment etc.), (2) according to phase of the project (feasibility studies, advice and pre-design, design, project management, and services during construction) and (3) according to object (buildings, civil engineering works, industrial plant and processes). Companies organize and reorganize themselves in many different ways.

Engineering services are generally limited to firms within the industry and engineering firms

produce almost only engineering services. Exceptions can be found on the borderline with construction firms and products. A special class of 'contracting engineers' combines engineering services and construction. They also deliver pure engineering services and these companies should be included in the sample frame. In some countries it is hard to make a distinction between engineering and construction. One price is set for the whole product which includes engineering and construction activities for example due to vertical integration.

Architects form quite a different industry. The main split in their products is between architectural services and urban planning services.

3. Sample design

Most countries use PPS sampling. Alternatively, stratified sampling by turnover is used (e.g. in the Netherlands). It is recommended to sample large companies integrally. As the market structure and market shares in the industry are generally stable, reweighting once every five years should suffice.

4. Main pricing methods

The three main methods are:

1. Model prices;
2. Charge-out rates;
3. Percentage fee of construction costs.

Model prices and charge-out rates as defined in the general part of this manual in sections 2.8.2 and 2.9.2.1 (part a) respectively are the basic types of surveyed information. Both exist in a number of varieties. A special issue with model pricing in these industries is the duration and size of the projects. As some engineering projects are very large and last for many years these projects are too complex to include in model pricing. Thereby, a bias towards selecting small projects in the PPI survey arises. A method based on percentage fee of construction costs can be used for construction engineers and architects using the general method as described in section 2.7.

5. Costs and benefits of the alternative pricing methods

There are not many alternative methods known other than those described above. Norway experimented with a hedonic-like analysis but stopped this approach. Direct use of prices of repeated services and contract pricing are not possible due to the unique nature of the services.

As with other industries model pricing is the preferred approach due to its ability to capture productivity changes over time as opposed to the use of charge-out rates. However model pricing involves a higher respondent burden and care must be taken to ensure the model remains representative and estimates actual transaction prices.

6. Quality issues

Model pricing attempts to price a constant quality output, but the aims of a Fixed Input/Output Price Index are hard to achieve as engineers change their work processes continuously and services are unique. A gradual increase in the overall technological level probably exists but is hard to quantify. As engineers' work is highly supported by automated systems, IT developments have potentially a strong effect on the industry. A problem arises in model pricing when an outdated service is replaced by a newer one; the choice for the method of quality adjustment procedure in linking to the new service can be decisive for how quality change is treated in the index.

7. Collection of the information

There are few specific collection aspects for engineers. For large firms the people filling in the survey are often controllers or bookkeepers who do not have a precise insight in engineering services. Especially for model pricing or explicit efficiency surveys professional engineers are required; preferably even high level staff like project managers. (See also the examples at the end of this section which show survey forms used in a bi-annual model pricing survey in Switzerland).

Another important issue concerns the use of job titles in hourly charge-out rate methods. A similar title (e.g. "constructor" or "designer") can mean very different staff in different companies. In the aggregation of a SPPI based on hourly rates, it is important that no classes are formed by job title. In other words, it is recommended to refrain from the use of an elementary index formula that combines hourly rates only because the job title is similar.

In most areas of engineering there are many companies who truly compete with each other. Confidentiality problems are therefore unlikely.

8. Specific aspects

CPIs do not always include architecture or engineering services as they are a very limited expense category for households, and are rather related to investment than consumption by their nature. If included, the CPI may benefit from a good PPI by copying the index (including taxes). 'Interior design' is another industry e.g. in NACE it is subcategory 748713.

Sub contracting (see section 1.2.2) can be common in engineering services and it depends on the registration of the National Accounts whether to include or exclude subcontracting in the compilation of the SPPI. In the Netherlands it is recommended to exclude subcontracting from the survey and if it is possible to survey subcontracting separately to compile one SPPI for engineering and one SPPI for subcontracting. In practice it is hard to distinguish subcontracting so it is sufficient to compile a PPI excluding subcontracting.

Export can represent a significant market share, e.g. in France. It is necessary to address exports in the index, even if it is purposely excluded in the initial setup of the index. For instance, the survey for average charge-out rates should explicitly state whether exports are included, excluded or surveyed separately.

Timing is an interesting issue for the SPPI of engineering services. There can be a large period between the moment of the closing of a contract, the delivery of the service and the payments. It can be many years, for instance, between the initial feasibility study and the end of the project management of the construction of a large dam or railway line. A client could regard it as one big complex service, as he does not have any need for only part of it. As explained in section 2.8, when using model pricing, price estimation should still be based on the market situation prevailing in the survey period for all parts of a project.

9. Overview of national methods

In **Australia** the industry uses a number of approaches for price setting. For the survey, each firm uses the methodology which relates closest to the way the firm sets its prices. Both simple models and charge-out rates are used. Data has been collected for building/structural and civil engineering services. The scope of these services will be expanded in the future.

In **Canada** the price index is estimated by the wage rate index (only for personnel that work on projects) multiplied by the change over time in realised mark-ups on the labour services and other inputs. By including mark-ups per region and field, market conditions are reflected in the price index. Eleven fields are distinguished.

France uses charge-out rates as the pricing method. In principle realized charge-out rates are used split by Industry, Construction and Infrastructure. Industry is split further on a deeper level in different stages. Not every respondent can generate turnover per field and the hours worked for clients. From these companies standard hourly rates are surveyed.

The **Netherlands** surveys realized charge-out rates. Turnover and the number of hours worked for clients during the whole quarter are surveyed, as much as possible split up per grade of professional and per field. There are six fields in the aggregation structure. Additionally, realized charge-out rates per year and standard hourly rates per January 1st are surveyed). For price setting, architects use a standard industry-wide formula for percentages of construction costs; after a pilot study it was considered to base the architecture PPI on this system, but this decision has not yet been made.

In **New Zealand** two methods are used: firstly, maximum hourly charge-out rates for principals representing general engineering work and secondly, fees for general engineering work and industrial building. These fees are calculated by applying a standard range of fees (in the form of a percentage) supplied by an institute to a value of engineering work supplied by the Capital Goods Price Index.

Norway experimented with a hedonic index on a quarterly basis. As it required much data and work, it was decided to base the index on a more conventional methodology. Norway now intends to use realized charge-out rates.

Sweden has a survey panel of approximately 40 firms. It surveys charge-out rates per grade that occur in real transactions during the survey quarter. These can be taken directly from ongoing

projects or newly closed contracts. The five areas of data collection are project management, industrial engineering, electrical engineering, heating and air conditioning/energy and construction and installation.

Switzerland has a biannual survey of model prices with an emphasis on small scale building projects (see example 2 below).

In the **United States** services specifications are used to measure prices for projects based on both fixed fees and non-fixed fees. The respondents reprice the service monthly whereby the price is an estimated new transaction. The engineering services are classified either as building or non-building related.

Example 1: Electrical engineering services

Project description:

Initial situation

Three-storey office building plus one underground parking level. Modular office partitions with suspended ceilings and double floor. Project assessment covers the entire low voltage wiring system, including the main voltage distributor and the following low voltage wiring items:

- Private Automatic Branch Exchange (PABX)

- Complete fire alarm system

- Universal cabling system for the building, including secondary fibre optic and tertiary copper cabling.

- Automatic blinds

SIA volumes: 48,000 m3

Office space: 8,500 m2

Partial phase 4.31 (preliminary design) has been completed.

For this phase, the cost of electrical installations (±15%) is estimated at: CHF 3,500,000.--

For the purposes of calculating the index, only partial phases 32/33 (preliminary project and building permit application process), 41 (calls for tenders) and 51, 52 and 53 (final project, project execution, putting into service, completion) are documented here.

1. Preliminary project and building permit application process (partial phases 32 and 33 based on RPH 108)	Your fees Fees reported in previous survey	Current fees
Basic information: Preliminary project and decision of public authorities Aim: project approved, costs and timetables checked, construction loan approved Expected results: Drafting of general construction plans, disposition plans and technical diagrams Price estimate ±10% The services to be rendered under RPH 108 articles 4.1.32 and 4.1.33 are as follows: - Developing the project, which includes drafting of general construction, disposition plans and technical diagrams; - Determining technical characteristics as well as energy and power needs; - Determining connections and recycling system; - Choosing the most suitable building utilities and installations to match the building's purpose; - Devising a system of measurements; - Devising a system to identify utilities; - Deciding exact needs in terms of space and volume, deciding the locations of the various utility rooms, machinery, devices and main conduits; - Making sure that energy saving features are used in construction; - Helping to coordinate the setup of utilities and installations; - Handling the building permit application process, which includes preparing the application; - Calculating expected operation and maintenance costs (relating specifically to the given area of activity); - Drawing up a detailed price estimate (accuracy: ±10%) Establishing a project timetable and deadlines based on decisions reached. Deadlines: Preliminary project phase to be completed six months after the contract is signed.		
Total fee for partial phases 32 and 33, preliminary project and price estimate, excluding VAT	58.000,00FR	56.000,00FR

Example 2: Civil engineering services

Building description:

Three-storey apartment building. Building volume calculated using SIA method: 8,500 m3, including basement level.

Ground floor and 1st floor are identical, attic leaning back, flat roof.

Basement level with laundry room, workshop areas, storage space and utility rooms, no underground parking.

Fee information to be provided:

We would like to know how prices have changed with respect to the previous survey held six months ago.

In other words, the fees you indicate should be based on current market prices for your field and take into account the fees you reported in the previous survey. Your fees apply to exactly the same services rendered under exactly the same conditions as the previous survey.

As a reminder, please find below the fees you reported in the previous survey.

Services to be rendered	**Your fees**	
	Fees reported in previous survey	Current fees
Partial phases according to RPH 103, engineer as specialist 31 Preliminary design, art. 4.2.31 32 Preliminary project, art. 4.2.32 41 Calls for tenders, art. 4.2.41 51 Final project, art. 4.2.51 52 Project execution, art. 4.2.52: project management, management of project changes and documentation, assistance during final inspection. Your rates include basic RPH 103 services where needed.		
Total amount charged for all civil engineering services to be rendered, phases 31 - 52, excluding VAT.	45.000,00FR	42.500,00FR

4.16 Technical testing and analysis

1. Description of the sector (ISIC 7422 / NACE 74.3)

Technical testing and analysis covers testing and inspection of all types of materials and products, certification of products as well as periodic road-safety testing of motor vehicles. The importance of the technical testing and analysis industry is quite small in Finland accounting only for 0,35 % of the Finnish service sector turnover. The purpose of technical testing and analysis services is usually to meet the demands of the law or otherwise confirm safety and reliability of companies' products and procedures. The most important services in the industry are inspections, certification, testing services as well as measuring and validation services. Testing and analysis services are mainly business-to-business activities.

The industry turnover has been rather stable in Finland during the last few years. There are a few major companies and a large number of smaller testing and analysis services providers in the industry. Many of the major companies are subsidiaries of multinational companies. Small companies usually focus on specific areas of testing and analysis, while major companies have a wider range of services.

In Finland technical testing and analysis is divided into periodic road-safety testing of motor vehicles and other testing and analysis services. Periodic road-safety testing of motor vehicles covers more than 30 % of the total industry turnover.

Testing and inspection of all types of materials and products includes a wide range of services. Testing of a certain characteristic of a product can be carried out in a number of different ways. The same tests can also be performed according to different standards since competing standards exists. International harmonisation of testing standards is still under way. Thus there are a large number of services that testing laboratories can provide. Finding the most representative services is a major challenge.

In Finland a large number of laboratories are classified in the business register under (NACE) 731 Research and experimental development on natural sciences and engineering. This causes difficulties in finding out the share of commercial technical testing and analysis of their turnover. Therefore laboratories are not included in the Finnish PPI. However, Finland is considering expanding the price collection to include laboratories in the future.

In Europe there exists EUROLAB (the European Federation of National Associations of Measurement, Testing and Analytical Laboratories) that coordinates European organisations having laboratory activities. EUROLAB provides a means for exchange of information and experience as well as promoting cost-effective testing, calibration and measurement services.

Certification of products includes series of standard tests to insure that a product is safe to use. Tests performed depend on the characteristics of a product. A certificate is proof that the product is in compliance with requirements. Different certificates are valid in different areas. For example with electric appliances FI-sign is valid in Finland, but a product needs a different certificate for the US market. Also international certificates exist. In future certificates are expected to further harmonise globally. Certification has extended from individual products to system certification. However, system certification has not yet been included in the NACE.

Certificates can be divided into two groups: certificates that require an outside evaluation and certificates that don't require an outside evaluation. With certificates which don't require an outside evaluation, a manufacturer can prove that the characteristics of a product are in compliance with safety requirements with self-made tests and sufficient documentation of tests performed. However, technical testing service providers also supply these tests and the documentation. These certificates, such as CE-certificate that relates to electric appliances, are reviewed by authorities with samples from the market. With certificates which require outside evaluation, licensed technical testing service providers perform necessary tests and review yearly that a product still satisfies requirements.

Periodic road-safety testing of motor vehicles includes a certain standard set of tests for different kinds of vehicles. Since the service performed is always the same, companies providing periodic road-safety testing of motor vehicles usually have tariff systems for different kinds of vehicles. This

testing service is targeted to both consumers and companies especially concerning cars, as the inspection is required by law. The price depends only on the size of a car, so cars intended for business or consumer use have the same price. Other vehicles are usually for business purposes.

The price development of testing with the use of models and mock-ups is not included in the Finnish PPI because of its small significance to the Finnish economy. In this kind of testing the focus is generally shifting towards computer aided testing.

2. Classification aspects and scope of the survey

In NACE (Rev.1.1) and ISIC (Rev.3.1) technical testing and analysis is classified as follows:

	Class	Label
ISIC 3.1	7422	Technical testing and analysis
NACE 1.1	743	Technical testing and analysis

This class includes the following services:

- Testing and inspection of all types of materials and products,
- Testing of composition and purity of minerals,
- Testing activities in the field of food hygiene, including veterinary testing and control in relation to food production,
- Testing of physical characteristics and performance of materials, such as strength, thickness, durability, radioactivity,
- Qualification and reliability testing,
- Performance testing of complete machinery: motors, automobiles, electronic equipment,
- Radiographic testing of welds and joints,
- Failure analysis,
- Testing and measuring of environmental indicators: air and water pollution,
- Certification of products, including consumer goods, motor vehicles, aircraft, pressurized containers, nuclear plants,
- Periodic road-safety testing of motor vehicles,
- Testing with use of models or mock-ups (e.g. of aircraft, ships, dams etc.).

CPC (Rev. 1.1) divides class 8356 Technical testing and analysis services into five subclasses: (1) composition and purity testing and analysis services, (2) testing and analysis services of physical properties, (3) testing and analysis services of integrated mechanical and electrical systems, (4) technical inspection services of road transport vehicles and (5) other technical testing and analysis services.

In Finland, where classification is based on NACE, technical testing and analysis is divided further into 74301 Technical testing and analysis and 74302 Periodic road-safety testing of motor vehicles.

3. Sample design

The sampling frame consists of all technical testing and analysis service providers which are included in the business register. The sample can be selected using PPS sampling. Also stratified sampling based on turnover, employment etc. can be used.

In Finland the sampling was conducted in two stages. The sampling frame was first divided into inspection of motor vehicles and other testing and analysis services. The national CPI already covered partly periodic road-safety testing of motor vehicles, so it provided a natural starting point for data collection. The CPI survey was expanded to cover SPPI relevant data[73]. The sample from other testing and analysis services providers was selected using discretion (i.e. purposive sampling) because not all companies classified as technical testing and analysis services providers in the business register are actually in this line of business. Also there are subsidiary enterprises that provide services only

[73] Even though the price definitions of these two indicators are different in theory, that is no problem in Finland in practice as long as the value-added correction of the base data is taken into account (there is no subsidies or other taxes).

for a parent company and thus their prices don't usually follow the market prices.

4. Main pricing methods

There is a wide range of services in the technical testing and analysis industry because of the large variety of products and characters being tested, testing methods and standards. Therefore the majority of services are one-off and rather complex. Periodic road-safety testing of motor vehicles constitutes an exception. Inspection of motor vehicles is usually a repeated standard service. Therefore direct use of prices of repeated services and model pricing seem to be the most appropriate pricing methods in this industry.

4.1 Periodic road-safety testing of motor vehicles

Taking into account that periodic road-safety testing services are rather simple and non-unique, **direct use of prices of repeated services** is the most appropriate pricing method. Existing tariff systems on the most important testing services can easily be used as price quotations. Thus this pricing method is quite simple and effective.

4.2 Other testing and analysis services

The price of a test depends on the product and the characteristic being tested, testing method and standard used, number of samples, quickness of results etc. Pricing based on working time is a poor price indicator because tests performed during an hour can vary extremely. Although other testing and analysis services are often complex and unique, it is possible to find services that reoccur. These services include food production control, purity tests, air and water pollution tests etc. In these cases the same tests and analysis are performed regularly with the same testing methods and standards. Therefore **pricing based on actual contracts** and simple **model pricing** are the most appropriate pricing methods (see sections 2.4.2 and 2.8.2 for more detail on these respective methods).

The price of a certification consists of the initial testing and annual testing to insure that the characteristics of a product have not changed. Thus, in addition to the first testing payment, a company has to pay an annual fee in order to keep a certificate. Because required tests depend on the characteristics of a product, every product needs a different set of tests. Companies providing testing services usually base their pricing on time use. Time used on testing depends on the complexity, size etc. of a product. Therefore the preferred method for pricing these services is **model pricing**.

5. Costs and benefits of the alternative pricing methods

A possible alternative pricing method is pricing based on working time, particularly concerning certification because these kinds of services are often rather complex and unique. Since companies providing testing and analysis services sometimes base their pricing on time use, this kind of information could be rather easily available. Pricing based on working time is, however, a poor price indicator because tests and analysis performed during an hour can vary extremely. Because tests need to be carefully defined so that the service remains constant, it is easier to price the test itself rather than hourly rates. Consequently the development of a representative model service for regular repricing which takes into account the changing nature of the market (i.e. approximates transaction prices) is the most appropriate.

6. Quality issues

Technical testing and analysis services evolve with technology and new services replace old services. This industry is however full of different kinds of standards and certificates. Once the services selected to price for data collection are well defined, there should be no problems with quality issues. The price of a test and an analysis depends on the product and the characteristics being tested, testing method and standard used etc. As the service selection in this industry is extremely wide, it is essential to carefully define all the factors that influence pricing and try to select those services that are most representative from that point of view.

Additionally, it is essential to control for the representativeness of services. As new services evolve the demand for old services declines. Regular updating of services and weights in price data collection is therefore important.

7. Collection of the information

Collection of price information is rather simple after representative services are selected in co-

operation with respondents. Services need to be strictly defined in price questionnaires so that any confusion is avoided. If the national CPI covers partly periodic road-safety testing of motor vehicles, the CPI survey can easily be expanded to include SPPI relevant data. As for other testing and analysis services, after initial contact with the companies the prices can be collected via email, fax, mail or web-application.

The data collection includes also the collection of micro level weights for each service category. These weights are collected from the enterprises annually.

8. Specific aspects

Technical testing and analysis service providers have an extremely wide service selection. Because there are such a large number of different services, finding the representative ones is a major challenge. In future global harmonisation of different standards may ease this task slightly, but other price determining factors of testing and analysis services still create a huge selection of services. The majority of testing and analysis services are unique, especially concerning certification. Because of this, it is even more difficult to define representative model services.

This is a good example of an industry where there is a large difference between the service product versus industry orientated index calculation structure. If the bases of the index are service products then the sample frame should include also major companies that are classified to other industries. If the purpose of index is to provide a good deflator then one of the main things is to decide the appropriate basis of the index in co-operation with national accounts experts.

9. Overview of national methods

The **UK** index for technical testing is based on prices charged to businesses for testing and analysis services. Technical testing services are mainly sought in order to introduce a recognised level of safety to a particular product or service. Some examples of this include: the safety testing of motor vehicles, ships, aircraft, pressurised containers and nuclear plants; the safety testing of electrical power tools; material strength/shrinkage testing in the textiles industry; testing steel for strength and impact in the building industry; testing the quality of water and air, measuring radioactivity and pollution; food hygiene testing for disease or levels of pesticide. The UK first published an SPPI for technical testing in 2000. The main methods of price collection are model contracts and actual contracts since most activity is of a specialist, tailor-made nature.

4.17 Advertising

1. Description of the sector (ISIC 743 / NACE 74.4)

Advertising services consists primarily of two separate activities. The first activity is the creation or preparation of advertisements. Included in advertisement creation services are writing copy, art work, graphics, and other creative work. The second activity is the placement or presentation of the advertisements. Advertisements may be placed or presented in a variety of medium, such as periodicals, newspapers, radio, television, on-line, bill boards, and flyers. Market research or advice can also be included if provided in conjunction with ad creation or placement.

Papers on advertising services were presented at Voorburg Group meetings in Örebro in 2001 and in Nantes in 2002. (See UK, AUS, FRA)

Advertising services are provided in all countries. The amount of advertising revenue is closely related to the business cycle. As economies grow or improve, advertising revenue increases. Conversely, during a tightening of the economy or a recession, advertising revenues decline. According to the 1998 Service Annual Survey from 1994-1998, a period of economic boom, advertising revenue increased an estimated 49.9% in the US.

2. Classification aspects and scope of the survey

In general, advertising services are provided by establishments which create and place ads such as advertising agencies. They can also be provided by establishments which provide direct advertising such as direct mail or other advertising services such as outdoor advertising (bill boards, transit and aerial advertising.)

Advertising services may be performed by advertising agencies using their own personnel such as account managers, production managers

and media planners. The advertising agency may also contract out part of their services. If the cost of hiring outside talent is passed on directly to the client, then this cost is not revenue for the advertising agency. However, any mark-up or additional fees the agency accrues from using this talent is included in the advertising agency's revenue.

Sales of advertising can occur in many different industries. Some of these industries in which advertising sales are considered primary revenues are newspaper publishing, periodical publishing, radio broadcasting, television broadcasting, cable television, internet service providers, web search portals and internet publishing. Advertising sales in these industries are not considered part of advertising services because these sales are really the publication, broadcast or display of the advertisement in most countries. However, this approach may differ in some countries. The cost of the ads may be included in the turnover data for the advertising agency. In this case, the prices collected would include not only the ad creation price or fee for placing the advertising but would also include the price for publishing or broadcasting the advertisement.

Within the advertising services sub-sector, there are many intra-industry transactions. An example of these intra-industry transactions is Media Buyer Services (MBS). Media buyers purchase ad space from media outlets and then resell this ad space primarily to advertising agencies.

Advertising is also created and placed by in-house advertising departments which are departments within a company or corporation specifically created to design, prepare and place advertising for the parent company. These in-house departments do not receive payment for their services but are salaried operations. Even though advertising services are provided by these departments, there is no marketed economic output generated. Therefore, these departments are not in-scope for a producer price index.

Most classification systems have a similar design for the advertising services sub-sector.

In the former Standard Industrial Classification system, advertising services were part of the business services sector. In the new North American Industrial Classification System, advertising services are included in the Professional, Technical and Scientific sector. NAICS 5418, Advertising and Related Services, industry group includes establishments classified in the following NAICS industries:

- NAICS 54181, Advertising Agencies,
- NAICS 54182, Public Relations Agencies,
- NAICS 54183, Media Buying Agencies,
- NAICS 54184, Media Representatives,
- NAICS 54185, Display Advertising,
- NAICS 54186, Direct Mail Advertising,
- NAICS 54187, Advertising Material Distribution Services,
- NAICS 54189, Other Services Related to Advertising.

The structure of ISIC Rev.3.1 Class 7430 and NACE Rev. 1.1 Class 74.40 are virtually identical. The ISIC and NACE Advertising structures are only slightly different from NAICS. NAICS includes direct mail advertising and public relation agencies which are excluded from ISIC 7430 and NACE 74.40. The ISIC class for advertising includes the creation and realization of advertising campaigns, specifically:

- Creating and placing advertising in various media formats,
- Media representation.

The International Product Classification (CPC version 1.1) has four products for advertising:

- CPC 83610: planning, creating, and placement services of advertising,
- CPC 83620: purchase or sale of advertising space or time on commission,
- CPC 83630: sale of advertising space or time (except on commission),
- CPC 83690: other advertising services.

Three of the product classes, 83610, 83620 and 83690 are included in advertising services.

One of the product classes, 83630, represents advertising sales by publishing and/or broadcasting companies. In these companies, the sale of advertising includes the publication and/or broadcasting of the advertisement. Advertising sales in these companies are not commission or fee based.

The publication structure for advertising services must accommodate the business structure of the companies in the sub-sector. For advertising agencies, different distinct activities or services are provided. These activities are ad creation and media or ad placement. In addition to this distinction between creation and placement, because of the product and price dispersion between different types of media, separate publication product lines for different types of media placement may be appropriate.

3. Sample design

A probability-proportionate-to-size sampling technique is recommended for this sector. Turnover data (revenue) or employment data should be used as the size measure. A comprehensive, detailed business register or similar source of establishments should be used as the frame for the sample. The frame should not be clustered by company or agency. Large companies have many separate affiliate offices which all function independently. Although these companies may share the same name, the clients and pricing structure are different for each location. Contracts are signed and pricing decisions are made at the local level. Especially for large, diverse countries, regional differences in the pricing decisions and contract negotiations make local pricing critical.

Industry concentration ratios indicate that large firms do not dominate in advertising services. But rather the advertising services sector is composed of many small firms. In the advertising agency industry in the US, the largest 4 firms account for only 4% of the employment and the largest 50 firms account for only 18.8% of the employment. In countries where the industry is structured in a similar manner with many small firms, large samples sizes may be required.

4. Main pricing methods

Model pricing is the main type of pricing methodology used for advertising services.

For the advertising services of ad creation, with this model pricing methodology, the respondent is requested to give a price for a fully virtual contract or a price based on a contract signed in the past. In the upcoming time periods, the respondents estimate what their price would be if that contract was renewed. The method gives a theoretically correct price concept since it takes changes in production into consideration in addition to changes in the current competitive environment. A contract is selected that specifies the services being performed and lists the hourly prices and the number of hours needed to conduct the work in the contract. When updating the prices, respondents are asked to take into account the labour costs (type of staff, number of hours and hourly rates), expenses, overhead and profit. Respondents are also asked to provide information if any of the features of the contract or staff information are no longer applicable. The type of price the respondent provides is an estimate of the project fee or the project fee plus commission, if a commission is charged.

For media or ad placement services, model pricing can also be used. The respondent is requested to give a price for a fully virtual contract or a price based on a contract signed in the past. In the upcoming time periods, the respondents estimate what their price would be if that contract was renewed. There are no hourly rates or staff hours listed in these contracts. The type of price is an estimate of the project or retainer fee or the commission and should be the monthly (or quarterly if pricing on a quarterly basis) fee or commission received for the placement of the ads in the contract. If the price is a commission, it is based on the total monetary value of the placed advertisements. If the publication structure for advertising services has detailed indices for media placement for different media, then the model should be limited to a single type of media. For example, the contract should only contain ads placed in newspapers not ads placed in television or radio.

In order to obtain a full transaction price for these models, these two service lines may have to be bundled for the service of media placement that includes ad creation. In this bundled service, respondents often charge for only the placement of the advertising and include the creation for 'free' or vice versa. In this situation, the complete description of the service provided must include both these activities.

Fallback pricing methodologies for ad creation services and media or ad placement are:

Component Pricing - The respondent chooses a representative contract, which is broken down into a number of key components. One or more of the key components are then priced in future periods.

This may make pricing easier for the respondent but does not provide a complete contract so discounting and other price changes may not be captured.

Hourly rates pricing - average hourly charge-out rates for specific ad creation professionals can be priced. In most cases, these professionals are a staff member, for example accounts manager or graphic artist. It is advisable to split up the staff by category and level of experience. In most cases, a list of hourly charge-out rates barely constitutes a reference for prices and is not generally acceptable. Furthermore, the price lists are usually only updated once a year.

Fixed fee - A fixed fee can be used for more regular services that don't have many components. However, this fee would be considered a list price if there are variables and the service is not fixed.

List prices for advertising services are not appropriate. Most prices in advertising are negotiated, highly variable and heavily discounted.

5. Costs and benefits of the alternative pricing methods

Ad creation is a custom service that is not usually repeated for the exact same services. The challenge is getting accurate estimates for this custom work. Model pricing using actually performed models yields the best results but all model pricing is still very difficult for reporters to price over time.

Unit values can be appropriate for those services which have limited variability. For example one could obtain unit value prices by dividing commission received by the number of ads placed in a certain homogenous time slot for television such as prime time viewing. The amount of bias created by use of the unit value method is a concern when different clients and different advertisements are used in the average.

Using list prices would create a bias that should be avoided.

6. Quality issues

In general, no data is usually available to perform quality adjustment for changes in the contracts or models in this industry. However, estimating the net transaction price using the model pricing methodology for this industry significantly reduces the need for quality adjustments. Even though the respondent may not perform the exact same services every month that are specified in the contract as long as they still offer those services, they can be priced and there is no need for quality adjustment. The respondent should use similar current contracts, which reflect changes in the economic environment, to estimate what the price would have been if the original contract had been sold in the current time period.

When services in a contract or model are no longer offered by the responding business, a substitution to a current contract or model is required. The current contract or model represents the services which are now being provided by the respondent. At the time of the substitution, an attempt should be made to solicit information from the respondent on the monetary value of the cost differences between the features in the old contract or model and the new contract or model. If the respondent can provide this information on a comparable basis, the data can be used to quality adjust the differences between the models or contracts. However, in most cases, the data doesn't exist. The features in the old contract reflect cost values from the original time period and the cost values for the new contracts are usually from the current time period. In this case, no comparison between the two contracts or models can be made.

7. Collection of information and specification of the services

The preferred method of collection is initial in-person visits to use probability proportionate to size sampling to select contracts to price. If PPS sampling and in-person visits are not feasible, then random selection of contracts can be used to select a variety of different services to price. Mail, fax, web or email reporting can be used to collect the updated information over time.

Ad creation services are comprised of a series of services provided by different types of personnel either at the agency or contracted out from the agency. These services are account management, media services and a large variety of creative services. Some of the creative services are provided by copy designers, writers, art directors, graphic artists, and production managers. Also included in ad creation services are fees. Some of

these fees are travel expense fees, fax fees, copying fees and other expenses fees. A percentage mark-up on the fees is also sometimes included in the final price (commission plus fees).

Ad placement services can be described using detailed terminology based on the type of media where the ad is placed. The media where the ad is placed is the largest price determining characteristics of the service. However, the price determining characteristics of ad placement services by different media are:

1. Radio

- length of the ad (15, 30, 60 seconds),
- time of day ad is aired,
- day of week ad is aired,
- delivery of ad by personality (D.J.) or by recording,
- ad aired around features (e.g. weather, sports, and traffic report),
- ad aired during popular seasons during the year:
  i. holidays,
  ii. graduation/weddings - May and June,
  iii. back to school - August and September,
- quantity of commercials bought (quantity discount),
- lead time of commercial purchase,
- guaranteed or preemptible,
- spot versus network radio,
- number of network affiliates.

2. Magazines

- size of the ad,
- placement (position) of the ad,
- black and white versus color,
- number of colors in the ad,
- "non-traditional" advertising features,
  i. coupons,
  ii. gatefolds,
  iii. pop-outs,
  iv. product samples,
- size of circulation,
- geographic and demographic targeting,
- discounts,
  i. frequency,
  ii. volume,
  iii. group,
  iv. corporate,
- bleed or non-bleed ad,
- national versus local advertising.

3. Newspapers

Type of ad (run of paper [ROP]/supplement; comics/ preprints; display/classified; black & white/color; coupon,)

- ad size (measured in column inches),
- day(s) of week ad is run,
- placement and positioning (ROP versus specific section/position),
- section of newspaper (main news, sports, real estate, business, etc.),
- position of the ad (coupon position, right or left hand side, etc.),
- type of ROP rate:
  i. general (common for national advertisers),
  ii. category (rates for advertisers of certain products or services),
  iii. local/retail,
  iv. classified,
  v. combination (e.g., Sunday/weekday or morning/evening combinations),
  vi. contract (for advertisers that frequently use newspapers),
- contract discounts:
  i. newsplan (for advertisers who place ROP ads totaling six or more times per year),
  ii. individual newspaper (discounts offered for bulk inches of space purchased).

4. Television (includes network, spot, and cable)

- time of day ad is aired,
- length of the ad 15, 30, 60 seconds):

i. infomercials (cable only),

- popularity of show (high versus low rating),
- geographic and demographic targeting,
- discounts:
  i. volume,
  ii. frequency,
- duration the ad is run (a.k.a. continuity),
- run of schedule (ROS) versus fixed placement,
- ad aired during popular seasons during the year,
- national versus local advertising,
- promotions and/or merchandising support.

For the bundled service of media placement including ad creation, all the detailed price determining characteristics of both services must be described fully.

8. Specific aspects

As the advertising industry changes over time, some services such as media placement are changing from commission pricing to fee-based pricing. These fees are sometimes referred to as project fees or retainer fees. As the companies change their price mechanisms, the type of price reported needs to be updated to accommodate the change. These fees are still based on the model or contract pricing methodology. To illustrate the strong move towards fees and away from commissions, a survey conducted in the US by the Association of National Advertisers has shown that advertising agency compensation has gone from 61% commissions, 35% fees in 1994 to 10% commissions, 74% fees in 2003.

9. Overview of national methods

The approach used by countries for pricing advertising services can be influenced by whether a gross or net approach is used for advertisement placements. If the cost of actual advertising space within the broadcasting entity / publisher is regarded as intermediate consumption for the ad placement agency and thus recuperated in their total revenue when placing ads for clients, then the weight for ad placement services in most countries will become larger (i.e. more than 50%) than for creative services and may dominate construction of the price index. This can be true to such an extent that some countries do not price creative services at all (e.g. Australia, UK). However in the case where ad placement is regarded as a margin service – that is only the revenue obtained from the commission in placing ads is considered as the output of the ad placement agency – the weight of ad placement in the SPPI will be much smaller.

To illustrate the above issue, in the **Netherlands** if a gross approach is taken for ad placement services then the weight of ad placements and ad creation in the SPPI would be approximately 50% each. However under a net approach the weight for ad placements is reduced to 6% and that of ad creation increases to 94%. Therefore it is important when compiling an SPPI to understand whether a net or gross approach for advertising services is used in the collection of value statistics and in the national accounts to ensure a consistent approach is taken when compiling the SPPI.

Korea, Finland and **Mexico** price advertising using list prices. **Czech Republic** and **Hong Kong, China** price advertising using transaction prices.

Australia prices advertisement placement using a unit value methodology. This methodology is employed due to the sensitive nature of commissions and fees. Companies report the average price for the middle of the quarter for the specified item across all clients.

New Zealand prices advertising creation and placement using charge out rates or fees and commissions applied to the price of the ad placement.

France measures advertising space sales using average prices for space and the commission or margin that is accrued to the advertising agency from that placement.

The **US** measures advertising placements and advertising creation using estimated net transaction prices for constant quality contracts or models.

The **UK** is currently developing an SPPI for the advertising placement industry. The advertising placement SPPI will monitor the price of advertising space on television and in printed publications. The television advertising SPPI is

created using unit prices estimated from current audience and revenue figures which are weighted together using revenue figures fixed in the base year 2000. A printed media advertising SPPI is created using unit prices estimated from current advertising rate card prices, adjusted by audience and discounting factors, which are weighted together using advertising revenue figures fixed in the base year 2000. The source data for this CSPI is being supplied by three third party organisations. It is anticipated that the advertising placement SPPI will be published in the 2005 Quarter 4 results on 17 February 2006.

4.18 Labour recruitment and provision of personnel

1. Description of the sector (ISIC 7491 / NACE 74.5)

Labour recruitment consists of all services relating to the search for and selection of candidates, and all ancillary services such as skills assessments. Recruitment consultancy consists of drawing up, in consultation with the client company, a description of the positions to be filled then searching for and selecting candidates. Recruitment agencies may use advertisements (increasingly online), the direct approach ("headhunting") or a combination of the two. All internet-based firms that primarily attempt to connect potential employees with a permanent position at a client firm seem to be in the scope.

In terms of product, the provision of personnel consists of all forms of personnel supply including temporary employment. A distinction is then made between the types of personnel supplied: office staff, domestic staff, labourer or technician, paramedical staff, other types of personnel. A temporary employment company supplies on a temporary basis personnel, which it recruits and remunerates via temporary employment agencies, under conditions which are stipulated by the employment code. The climate in temporary employment is closely linked to the general economic situation. Trends in the number of assignments are often an early indicator of economic turnarounds. The number of temporary staff being placed by agencies has consistently grown, reflecting a greater participation in the labour market and more flexible patterns of work.

In this area, there are very large industry operators and a large number of "niche" operators. The "niche" operator tends to focus on a particular segment of the market where specialized skills or knowledge is required.

Two sub-branches can be identified for monitoring prices: supply of personnel or help services (including temporary employment) and recruitment consultancy (or employment agency). The length of employment of the placed employee is not a major distinguishing characteristic between these two sub-branches. An employee who fills a position with the aid an establishment included in "help services" receives salary and benefits from the temporary agency, not from the firm for which the employee is actually working. An employee who fills a position (generally long term or permanent) with the aid of an employment agency fills that position in the same way as anybody else who has been employed directly by the company.

In the case of provision of personnel through "help services" (in particular for temporary work), the client pays the service company, which in turn pays some of this amount to the person supplied. In temporary employment, the temp agency pays the temporary worker his salary. It is important to recognize that the price to be collected is that charged to the client rather than that paid by the agency to the employee. The price may depend on factors such as: geographical location, type of work, the relationship between the temporary agency and the client, the length of the contract, level of skill. In some countries, the principle on invoicing consists of applying a multiplier coefficient to the temporary worker's hourly gross salary in order to obtain a price per hour. This price per hour has then to be multiplied by the number of hours charged. The hourly salary is negotiable between the temporary employment company and the client company, according to the temporary worker's qualifications and the economic circumstances. All things being equal, changes in salaries result in changes in prices. The multiplier coefficient is a strategic variable for the temporary employment company. It may depend on many parameters: the temporary worker's qualifications, type of client or length of assignment. The longer the assignment is, the lower the multiplier coefficient is - particularly if the work is for unskilled employees.

With major, regular clients, framework contracts exist which specify according to qualifications the hourly rate which must be charged. These framework contracts seem to be honoured quite frequently, even when there is a change in the economic situation. Generally, in this type of contract, temporary employment companies want a volume of activity, with comparatively low multiplier coefficients. The value of the multiplier coefficient for the same client seems to be quite stable over time.

There are several methods of invoicing for a labour recruitment agency: a set price, a percentage of the new recruit's salary or re-invoicing of costs with profit. Taking a percentage of the new recruit's annual salary seems to be the main method. One of the difficulties in collecting prices for labour recruitment is to clearly define what the client pays the agency for its services.

2. Classification aspects and scope of the survey

In terms of the international product classification (CPC version 1.1), group 851 includes "executive search and employment agency services" (category 8511) and "supply of personnel services" (category 8512).

Executive search services include services consisting of the search for, selection and referral of executive person for employment by others. The services may involve: formulation of job descriptions, screening and testing of applicants, investigation of references. The employment agency services include services consisting of selecting, referring and placing applicants in permanent and temporary basis, except executive search services.

The supply of personnel services is divided into the following subclasses: supply of office support personnel services, supply of domestic help personnel services, supply of other commercial or industrial workers services, supply of medical personnel services, and supply of other personnel services.

Recruitment agencies therefore come under category 8511 whilst temporary job agencies are in category 8512. More details can be found in the UN Classifications Registry (see Registry).

3. Sample design

Sampling is mainly based on business registers for services industries. Temporary employment companies can be located very easily from this source so this can be used directly. Regarding the supply of personnel outside of temporary employment, it can be more difficult to use business registers for sampling purposes. Many of the largest firms transfer staff between companies in the same group with no market price. In France these companies are excluded from the survey base and trade union's source is used in order to complete the sampling base.

The PPS sampling, by turnover or number of employees, is advisable. Another option is to include in the sample only the biggest firms (cut-off sampling) when it is felt they represent "properly" the whole market and the evolution of prices. This is achieved by only choosing businesses above a certain turnover (or number of employees) threshold. Economically for a given sub-group, this implies the assumption that the change in prices in a sub-group is similar to that found for the industry leaders. In some countries, where the market of temporary agencies is very concentrated, cut-off sampling is possible. PPS sampling is probably better than cut-off sampling for recruitment agencies because this market is less concentrated than for the provision of temporary workers. Some countries use "judgment samples", where the sample is selected on the basis of the knowledge and judgment of staff compiling the index. Interviews with respondents, market reports, and industry associations can help to form the bases for the selection of "judgment samples".

4. Main pricing methods

When considering pricing methods, it is crucial to define first the service for which prices are intended to be followed. After that, one can consider several methodologies. Common methods described below are charge-out rates, contract pricing, percentage fee and direct use of prices of repeated services.

a) Temporary agencies or "help services"

In the estimation of average prices, when using e.g. the charge-out rate method by qualification and user sector, hourly invoicing rates are calculated which take gross hourly salaries and multiplier coefficients into account. Assignments

relating to the level of qualification and user sector are selected; an average charged hourly rate is calculated based on the number of hours invoiced. This can be achieved, in theory, with the management system used by temporary employment companies. However, these are not indicators that small and medium-sized businesses normally use for their own purposes. Admission into the survey system therefore can be a great burden for the firm. Alternatively one could decide, for example, to track the average price of a welder in the shipbuilding industry to represent the "skilled worker for industry" post in the classification used in the survey. The choice of qualifications and client sectors would of course depend on the companies' specialisation.

With contract pricing, the principle consists of monitoring hourly prices charged for some qualifications based on the contract signed with a given client. One must ensure that this type of service can be monitored every quarter (regular client, qualification often required by this client). Of course, one must take qualifications and clients that are "representative" of the temporary employment company's business.

The principle is the same for supplying personnel outside of temporary employment (where the salary is still paid by the agency): price per hour or day depending on the person's qualifications. In this case, one can choose the charge-out rate approach or contract pricing approach.

b) Labour recruitment agencies

It is possible to monitor price evolution in different ways for labour recruitment agencies: one can collect a standard fee (i.e. direct use of prices of repeated services) or a commission fee which is a proportion of the recruited employee's salary (i.e. the percentage fee method). This last case is less straightforward as salaries vary for every employee recruited and therefore reference to average earnings for different categories of occupations is required. The percentage fee is generally stable and thus price increases generally occur due to movement in average earnings for the occupation group used as a reference. Therefore it is very important that reference to average earnings statistics for occupation groups match the types of positions placed by the recruitment agencies.

5. Costs and benefits of the alternative pricing methods

Monitoring average prices by qualification and sector (charge-out rate method) in temporary agencies can introduce a bias associated, for example, with the average length of assignments. Average prices are calculated whatever the length of assignment. For long assignments, the multiplier coefficient may be lower. If the average length of assignments increases over time, there will be a reduction in the average price due to this fact alone. After talking to companies, it seems that this limit is not very important: the average length of assignments seems stable and the link between hourly price and length of assignment does not seem to be as obvious as that. In any case, it is of course very important to break down the data collection of average hourly price into different categories of qualifications and user sectors to minimise the heterogeneity of the services. Another problem is price discrimination: the price would be different for the same qualification if the clients were different. For example the price would be lower for a large or a new client rather than other clients. The average price per qualification depends of the nature of clients (the proportion of large clients, of new clients...).

Choosing between the two methods (charge-out rate method and contract pricing approach) in the case of temporary agencies largely depends on the following two parameters: firstly, the burden of response and the companies' wish to calculate average prices by qualification and client's economic sector and secondly, the structure of the clientele and the specialization of the temporary employment company. If there are many clients, few of whom are regular, with different prices charged, it will be difficult to identify a particular number of "representative" clients for use in contract pricing.

6. Quality issues

First, it is crucial to define the output of this industry. The output definition of temporary work services is the provision of labour and not the result of the labour performed by the temporary workers. Consequently, prices of working hours of temporary workers should not be quality adjusted. This aspect is one of the most important points in this industry.

Using the percentage fee method for labour recruitment agencies can be problematic where reliable and frequent time series of average earnings by detailed occupational group are not available. Such detailed statistics may only be available on an infrequent basis and proxies such as indices of wage rates available at more aggregate levels may have to be used which would lower the quality of the price index. This can be a particular problem for executive recruitment or "head hunting". Following the price evolution of executive salaries can be very difficult and it may be best to focus on other labour recruitment agencies.

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with the professional organization and enterprises (particularly the most important ones in provision of temporary workers) prices can be collected via Internet or by mail. Nevertheless, there may be some problems in cooperation in this industry, as temporary help companies are often hesitant to divulge price information.

8. Specific aspects

A major concern in the industry of provision of personnel is the definition of the service product. As pointed out in section 1.2.2 of this guide the ESA recommends that persons employed by temporary employment agencies are to be included in the industry of the agency which employs them, and not in the industry of the enterprise for which they actually work. Thus, the value of output by the agencies amounts to all payments including compensation of temporary employees and not only "net fees" received by the agency. A treatment on a net basis might be considered for purposes of input-output analysis in which case temporary workers are reclassified into the enterprise where they actually work and only net fees are recorded as value of services purchased from the agency. Nevertheless, any decision about the gross or net treatment of prices underlying SPPI should be made in line with national accounts practice that may vary between countries. In Europe, the gross approach is more used and more adapted than the net approach. Of course, the weighting coefficient of provision of temporary workers in the business services industry is lower if the net approach is chosen.

As mentioned in the previous part, the definition of the service product in this industry is one of the key aspects (the provision of labour availability and not the result of the labour done by the temporary workers).

9. Overview of national methods

In **Australia**, "Employment Placement" represents businesses engaged in the provision of employment placement services including search, selection, referral, placements and recruitment on a permanent basis. "Contract Staff Services" consist of businesses engaged in job placement on a temporary basis where wages and associated costs are paid by the business performing the placement i.e. the contractor is effectively employed by the contract staff agency. The types of pricing methods used within "Contract Staff Services" and "Employment Placement" are: component pricing, where clearly identified and representative products are selected with conditions of sale, contract pricing, charge-out rate and average prices. For example, the firms can provide "the average percentage fee for the Top Ten accounts in the three months of this quarter, for full time placements" in order to monitor the evolution of prices in "Employment Placement". Many firms within the Employment Placement Industry charge their services as a percentage of the placed candidates starting salary. As this percentage fee rarely changes, the resulting price change follows closely the Wage Cost Index (WCI) that is used to account increased remuneration over time.

Statistics **Denmark** began in 2004 the data collection in "labour recruitment and provision of personnel". For the pricing method in labour recruitment, hourly prices and standard prices (for example price for personality testing) are collected. For the pricing method in provision of personnel, hourly prices for the personnel category and prices that look like weekly payment for single persons are collected.

In **France**, the contract pricing and charge-out rate methods are used in order to monitor the evolution of price in "labour recruitment and provision of personnel". Reductions in employers' social security contributions have a considerable influence on prices and the profit made by

temporary employment companies in France. These reductions have become increasingly important in France, particularly following the introduction of a 35-hour week (Aubry laws 1 and 2). The temporary employment company receives the reductions in employers' social security contributions. In this case, it does not have a direct effect on price. This explains why prices can remain stable in very favourable economic circumstances, if there are more reductions in employers' social security contributions. The client company, knowing that the temporary employment company is going to benefit from these reductions, can negotiate a lower multiplier coefficient. In this situation, the mechanism by which employers' social security contributions are reduced has an effect on prices. Generally speaking, variations in reductions in employers' social security contributions impact on the prices charged and in particular the link between the economic climate and price variation.

In **Japan**'s service price index, the CSPI, there is an item named "Temporary employment agency services" that corresponds to "labour recruitment and provision of personnel" services. The item includes temporary employment services, which consist of office support occupations (e.g., secretaries, receptionist, clerks, book-keepers, data entry operators, and work processor operators), software development engineers, interpreters, translators, producers and editors of books, and instructors for computer operations. The pricing method adopted in Japan is monthly rate per person (charge-out rate method). The price is calculated from the total value of the transaction divided by the total quantity of the transaction that approximately equals the number of temporary workers. When calculating this monthly rate per person, however, the following characteristics are fixed in order not to reflect fluctuations other than those caused by changes in the supply-demand conditions: (1) The contents of the work (e.g.. the payments to workers engaged in translation may differ from those to workers engaged in filing); (2) Region (there is regional price difference among temporary workers); (3) The content of the contract (the price may differ between fresh contract and renewed contract); (4) The experience or trained level of the worker; (5) The corporation size of the firms that contracted with the agency.

Labour recruitment agencies in the **UK** typically operate in one of three ways. They may (1) specialise in placing staff with particular skills in a particular sector, (2) supply workers of all kinds within their locality, and (3), through specialist agencies, deal with headhunting, out-placement or consultancy. Across all of these activities, the agencies act as intermediaries through which parties find each other for the purpose of undertaking work. In temporary placements, the distribution of skills and occupations, placed by labour recruitment agencies, reflects the needs of the economy. It has been estimated that around 70 per cent of all temporary placements are male overall, with peaks of over 90 per cent of male temporary workers in occupational groups such as building labourers, building tradesmen, drivers, engineering and electronics. Temporary female workers provide around 80 per cent of placements in medical, healthcare and nursing occupational groups. In permanent placements, most vacancies are in IT, computing and telecommunications, secretarial, clerical and junior office staff.

A client pays the agency to fill a post that is vacant, with either a temporary employee or a permanent one. If the post is permanent, a fee (usually a percentage of the annual salary) is earned by the agency. If the post is temporary, there is an hourly (or sometimes weekly) rate charged for supplying the employee. In either case, this fee/rate will not only cover the wage of the employee but also National Insurance contributions and other overheads of the agency. The fee or rate may be negotiable and can depend on factors, such as: geographical location; salary offered, if permanent; type of work offered; the potential employer relationship status with the agency; length of contract offered; level of skill required. The published data for labour recruitment services has shown a steady increase, for the most part, over the last five years. The main reasons for price changes in this industry are supply and demand, minimum wage and general wage costs.

One of the difficulties in collecting prices for labour recruitment is separating what the client pays the agency for its services and the salary that is paid to the employee being placed. In some cases, a labour recruitment agency will actually employ the staff being placed rather than the client. This means the client is paying the agency both the employee's salary and their commission fee, making the two components difficult to separate. To avoid this problem, prices are collected in three different ways: in most cases a

labour recruitment agency will return a commission rate. For example, 50p per hour for a sales assistant; they may also return a standard fee for placing an employee in a vacancy; finally, a respondent may return a commission fee in the form of a percentage figure that represents the proportion that they take from an employee's salary.

In the US, the industry of employment agency is divided into three major groupings. The most important grouping is "contingent payment recruiting". If a firm receives a commission fee that is paid only upon successfully making a placement, then the services conducted are considered "Contingency Payment Recruiting". If a firm receives a portion of the commission, up front without necessarily filling the placement, this service is considered "Retained Executive Recruiting". If a firm primarily does not receive commission payments at all, but rather some of fees directly related to membership in an Internet network of job-offers and job seekers, then the firm primarily engages in "Internet Recruiting Services". In the US, there are two major factors that determine prices in the industry of employment agency: commission percentage, and the first-year compensation package of position. Once the product is very well defined, contract pricing approach or component pricing approach are used. It is very interesting to note that the variations in price due to switching of clients represent real price changes experienced by the firm, and are not quality adjusted for. In help supply services, temporary help makes up approximately 80 percent of employment and Professional Employer Organizations/Employee Leasing (PEO) firms makes up the remaining 20 percent. A PEO Firm engages in an agreement whereby a business transfers its employee to the payroll of a leasing organization after which the employees are leased back to their original employer where they continue working in the same capacity as before in an ongoing, permanent relationship. Pay rolling is a service where the business customer, not the temporary help firm, does the recruiting of the temporary employee and then asks the temporary help firm to employ the person and treat them as other temporary help. Once the product is very well defined – with a lot of criterion – contract pricing and component pricing are used. In some cases, with custom services, repricing is a very hard task for the firm: estimated prices should be considered in this case. It seems to be very similar to model pricing approach, nevertheless in the first period a "real" transaction occurs (it is not necessarily the case with model pricing approach). List prices can be used in temporary help.

4.19 Investigation and security activities

1. Description of sector (ISIC 7492 / NACE 74.6)

The industry of investigation and security service activities accounts for approximately 0.3 per cent of the total turnover of service industries in Finland. The main services of the industry are guarding of people and property, which generate the vast majority of the turnover of the companies operating in the industry and are, therefore, the foundation on which these companies build their business activity. In practise the share of the turnover of investigation in Finland is very small. This means that the methods described here are more concentrated on the security part of the activity. For large companies in the industry, investigation and security services are usually activities of less importance, supplementing their guarding activities. However, they are significant to the companies from the point of their comprehensive security service image, and are used to enhance the range of the offered services so as to cover all the security needs of their customers. Small companies, in turn, naturally also offer guarding services but often specialise precisely on services that generate smaller turnover, which they have then made into their own areas of special expertise.

Over the past decade or so, this industry has been growing strongly, and still continues to do so. The growth follows the global trend of increasing investments in security matters, especially by business enterprises. At the same time, central governments have been cutting their expenditure on security services (e.g. such as police). These facts together with today's mounting atmosphere of insecurity have generated strong demand for the services of this industry. In addition, many business enterprises have subcontracted their security services to companies operating in the industry, thereby contributing to the growth of the industry even further. As the services and the companies in the industry improve, central

governments are co-operating more and more with these specialist companies in producing and supplying their security services. While this development trend prevails, the growth of the industry can be expected to continue, as it will enable the companies operating in this industry to start offering also services traditionally provided by the police. However, in many countries this kind of development would necessitate legislative changes, as well as toughened criteria with regard to the training and development of staff in these companies.

The enterprises in this industry usually comprise a few large and medium-size companies, and a host of small operators. The large companies generate a considerable proportion of the total turnover of the industry, and do often major international companies constitute market leaders in many countries. The small companies are minor local operators, whereas the large companies operate over extensive geographic areas. The range of the services offered by these companies also grows as company size increases: the largest firms can supply a fairly sophisticated range while the smallest ones are content with providing the already mentioned traditional investigation and security services. The industry's main customers are other business enterprises and the turnover of the whole industry comes almost entirely from the services bought by them. Because of the large proportion of service contracts with business enterprises, demand by households makes up only a minor part of the industry's total demand. Nevertheless, improved availability of the services has been increasing their demand by households, too. However, for the time being the services provided to households is still a minor proportion of the total market.

Despite the strong growth of the industry, its market structure has remained relatively stable. Between them, the large companies cover a significant proportion of the market and dominate the industry. The market shares of these companies are steady and only really change as a consequence of business take-overs. The small companies in the industry fight for their market shares under pressure from the large ones. The market shares of these companies can fluctuate significantly as a result of competition. Nevertheless, the influence of this competition for market shares is minor on the market structure of the whole industry. Because of the aforementioned reasons, many countries use a five-year cycle for reviewing the weights of the price indices for the industry, and this can generally be regarded as a satisfactory weight revision interval.

2. Classification aspects and scope of the survey

The companies offering investigation and security services usually concentrate on their areas of core competence. They supply almost exclusively only those services that relate to their own industry, that is, they hardly ever engage in activities that depart from the main activity of their own industry. This makes their classification straightforward. ISIC and NACE classify enterprises supplying investigation and security services as follows:

ISIC Revision 3.1 class 7492 Investigation and security activities

NACE Revision 1.1 class 74.60 Investigation and security activities

The services under these classes are:

- Surveillance, guarding and other security services,
- Transport of valuables,
- Body guarding,
- Surveillance and street patrolling of residential buildings, offices, factories, construction sites, hotels, theatres, amusement venues, sport stadiums, shopping centres, etc.
- Public transport safety procedures, such as security checking of luggage and passengers at airports and security guarding of trains and underground trains,
- Store detective services,
- Operation of service telephone lines or the like for remote monitoring of mechanical equipment,
- Screening of alarms (to identify false alarms) and calling of police, fire or ambulance services as necessary,
- Consultancy on household and public sector security systems, including background security vetting of individuals,

- Destruction of data from any data carrier,
- Private investigation activity.

Over the past decade, the services of the industry have been developing strongly especially due to advancements in technological solutions. Large companies in the industry have been able to exploit this efficiently and thereby make considerably better progress than the small operators in the field have been capable of making. A good example of this is the emergency call centre services with extensive geographic coverage that are offered by the largest companies in the industry. Small and local operators are unable to provide services of similar scale because of the substantial fixed costs involved. Partly just for this reason many small companies in the industry have concentrated on their own, narrow areas of competence, thus gaining a competitive edge through their special expertise or geographic location. The development of the services offered by the industry has focused on reinforcing its own strengths. Consequently, it has caused no classification problems thus far, as the competition has not extended to other industries.

As the co-operation between central governments and security companies intensifies, the services offered by the security companies have been increasingly approaching the traditional tasks of the police. However, this has not yet caused problems in the classification of the services, but the kind of future situation is well foreseeable in which some of the services of the companies may become classified into categories traditionally associated which the tasks of the police. Yet, even in such situation the share of the services concerned is likely to remain minor, with no bearing on the classification of enterprises into different industries.

Companies engaged in investigation and security service activities can be adequately and exhaustively classified according to ISIC. It is the most frequently used classification, which many countries have adapted and improved to suit the special national characteristics of different industries. These national adaptations must always be thoroughly taken into account in the compiling and reviewing of a price index for the industry.

In Finland, security service activities have been divided into five service types, on four of which price data are collected. The service types are:

1. District guarding services;
2. Local guarding services;
3. Store guarding services;
4. Emergency call centre services;
5. Money transport services.

Except for money transport services, price data are collected on all of these service types. No price data have been available for money transport services, as their collection is problematic. The contracts selected for the index calculation have been grouped according to the types of services on which the enterprises drawn into the sample provide price data.

3. Sample design

The population of the companies engaged in investigation and security service activities are comprised of a large group of small companies and a few medium-size and large companies. The collection of price data from small companies is difficult in practice, which is why purposive cut-off sampling often has to be used to reduce the size of the sampling frame. An example of a commonly used cut-off threshold would be one per cent, that is, all the companies whose turnover falls short of one per cent of the total turnover of the industry are excluded from the frame. However, it should be noted here that the sample is then no longer representative of the entire industry. However, in practice, the inconsistency in the representation is not significant.

Nevertheless, among the small companies there may be some that are undergoing strong growth and are approaching the cut-off threshold. If it can be assumed that they will very soon be crossing the threshold they can be included in the sample.

The sampling methods usually opted for are stratified sampling according to company size or PPS (Probability Proportional to Size) sampling. These sampling methods allow for differences in company sizes to be taken into consideration. The size of the sample is, in practice, determined either with statistical methods or according to available resources.

Purposive and statistical sampling methods can often be successfully combined. For example, if an industry is dominated by a couple of enterprises, these can be formed into their own stratum from which all units are selected into the

sample. The remaining enterprises form the other strata and are selected using either PPS or random sampling. If necessary, a sampling design with more than one dimension can be resorted to. If, for example, regional differences are observed in a price change, the use of geographic area as a stratification variable can be considered.

Sampling can involve several levels, meaning that before actual data on a price are obtained, the price observation concerned may have gone through more than one sampling. For instance, a sample may have been drawn first of enterprises, then of representative services and finally of contracts. However, random, stratified or PPS sampling can be used at all levels of sampling.

In Finland the Business Register was used as a sampling frame. The enterprises were stratified into two strata depending on turnover. In this pilot stage the sample was realised only for the strata consisting of large enterprises. The sample will be supplemented later on with smaller enterprises. A good geographical coverage was already obtained using only the large enterprise strata. The actualised total sample size was 3 enterprises and 160 price quotations. The actual coverage rate in terms of turnover is approximately 42 %.

The selection of the contracts was made in co-operation with enterprises, but these can also be drawn using statistical sampling. The contracts were first divided into service categories and then further into two geographical areas (greater Helsinki area and rest of the country) and into two price categories that reflect the actual volume of the service. The sample size for each contract strata inside of the enterprise was proportional to stratum group's weight according to information obtained from the enterprise. The Enterprises selected representative contracts from each strata (one enterprise sent their data into Statistics Finland were the selection was made using PPS) using either random sampling or judgement.

4. The pricing method used

The selection of the pricing method must take into account the special characteristics of pricing in the industry. Long-term contracts tailored to customer needs and specifying in great detail the contents and the price of the service concerned for the whole contract duration, are typical in the investigation and security service industry. Such contracts are prevalent especially in the large companies of the industry, and their prices are arrived at after mutual negotiations between service providers and clients.

List prices, if available, are often the quickest and least labour-intensive way to obtain relevant service price data. In practice, however, the list prices published by companies do not represent the real prices customers pay for the services. Large customers may be able to plead their major customer potential and get lower prices than those published. By contrast, contracts with customers with only minor market power generally follow fairly closely published list prices.

The list prices are not easily available in Finland. The common practise is that enterprises encourage the potential customer to take the first contact by email or phone. Based on negotiations with enterprises it was decided that contract prices are collected from the companies. These prices show directly the real prices paid for the services and their periodic monitoring is also usually easy due to the length of the contracts.

5. Costs and benefits of the alternative pricing methods

When the contracts are well selected, the contract pricing gives an accurate picture of real transaction price movements. Under certain assumptions it is almost as effective as model pricing. One should, however, be vigilant that prices represent adequately the population also in terms of the timing of contract periods. (See discussion in section 2.4.2).

Perhaps the largest shortcoming of the contract pricing method is that it requires considerable initial effort from the data supplier, in order to make sure that representative contracts become selected in a statistically correct and efficient manner. In addition, it has to be ensured that all the price determining characters are specified in the sample contracts. On the other hand, once the contracts have been selected and the initial effort made, use of contract prices is quite a cost-effective method to compile SPPI.

Timeliness of the price data is a problem in pricing from contracts, in other words changes in prices do not necessarily show in contracts as quickly as they do in list prices. The price change of a new contract may not be of the same magnitude as that of an old contract. Quality changes caused by dissimilarities in renewed

contracts contents might also cause some potential problems (this might also be problem in the case where part of the sample is continuously renewed). To make sure that the contents of the contract is unchanged is time consuming and requires familiarity with the price determining characteristics of the contracts. Substitute contracts may be difficult to find, which is why changes in quality are not easy to follow.

6. Quality issues

In the investigation and security service industry, changes in quality mainly arise from variations in the compositions of the agreed services. Changes in quality must always be dealt with and decisions made as to whether they require any adjustments in the compilation of the index. In practice, minor changes can be ignored, but the goal that should always be striven for within the available resources is not to weaken the quality of the index because of these changes, otherwise its representativeness suffers and price changes can no longer be regarded as reliable.

Of course the ideal alternative would be to substitute a changed contract with a new one with identical contents. In this case care should be taken that possible 'sales bias' of the substituting contract is avoided in an SPPI. (See section 2.4.2). Substitutes with identical contents can usually be found for standard contracts. However, it is generally the case that major contracts contain such detailed specifications that finding substitutes for them may be difficult or even impossible.

It may also be possible to quantify a change in the quality of a service. In this case, use of the changed contract in the index could be continued, but the quality change would have to be allowed for continuously in the compilation of the index. In practice, however, quality changes are very difficult to quantify.

7. Collection of the information

The most important thing when information is being collected from data suppliers is to make sure it is correct and appropriate. The information must represent as well as possible the diversity of services in the industry and their price development. To achieve this, it has to be ensured from experts in the industry that the collected information is relevant and sufficient. The experts representing the industry must be from upper management of companies, commanding a broad overview of the services concerned and of the industry as a whole. This will ensure high quality and representativeness of the index for the industry.

In an ideal situation, besides price data, the following information should be collected about services:

- Type of service,
- Customer details,
- Possible quality changes,
- Special conditions of contracts.

In practice, however, the target companies cannot be overburdened with data supply obligations, as this would endanger the quality of the data. This is why all the desired data are often not received from the target companies. Decisions about which data are the most central and crucial in a given situation must be made case-by-case, and efforts should then be focused on getting these data.

Special efforts in the data collection should be made to ensure that the contents of the data remain unchanged from one collection round to the next, in other words the supplying companies must be consulted to make sure that a service has not changed in terms of contents since the previous collection round. If there has been a change in contents, a price change no longer measures directly the desired price, and steps have to be taken to allow for a change in quality.

In Finland, price data are collected for the four service types already mentioned, on which the data are requested from companies operating in the industry. Customer details are obtained in the form of customer numbers in connection with the reporting of price data. In addition, the companies supplying the data are requested to provide information about any possible quality changes in the context of price data reported. Such information is carefully considered and acted on to ensure the ongoing quality of the index. The questionnaires are sent quarterly to the enterprises by e-mail. The contract prices with identification number and comments on quality changes are received in excel-format.

8. Specific aspects

The industry is highly concentrated, that is, a few large companies account for a considerable

proportion of the total turnover of the whole industry. Small companies are numerous, but their shares of the total turnover of the industry are negligible. For this reason, major contracts go to just a couple of the largest companies in the industry, because other companies are unable to offer sufficiently exhaustive services. Long-term contracts are also characteristic in this industry. The duration of the contracts entered into with customers is usually comparatively long, because the quality of the services stays stable for a long time and the demand for the services is continuous.

The largest single cost item in investigation and security service activities is labour costs. Therefore, labour costs are also the main determinant of the prices of the services. Wages and salaries are rigid and change seldom, often only once a year. For this reason contract prices also often change only once a year as a result of pay reviews. The changes in the prices of old contracts follow chiefly the development of labour costs. The bases on which the prices of the contracts to be newly drawn up are determined may differ slightly from those on which the prices in old contracts were settled, so it is important to monitor also new contracts so that changes in contract prices can be generalised to concern the whole industry.

9. Overview of national methods

In **Finland**, data on real contract prices are collected from the largest companies in the industry whose combined coverage of the whole industry is considerable. These companies primarily offer only guarding services. The prices of the services of the industry are monitored quarterly and the index is calculated as a Laspeyres type of chain index.

The Czech Republic collects contract prices from approximately 30 data suppliers. The index calculated from these contract prices is published monthly. For the moment price data for the calculation of SPPI are only collected on one service, which thus represents the whole industry. Changes in quality are monitored against estimates obtained from the data suppliers, who are asked to estimate what proportion of a change in the service price is caused by a change in quality and what proportion represents a genuine price change.

Japan calculates an index for the industry from service contract prices. The collected service prices are inclusive of an excise duty. The index is published monthly and calculated as a Laspeyres index. Quality changes are taken into account case-by-case using the method most appropriate for the situation.

The Slovak Republic has conducted a pilot project on the compilation of an index for the industry, and has started to calculate an index on the strength of its results. The index is calculated monthly.

In the **US** the security company determines the charge-out rates for each contract based on details of the service provided. These include the characteristics like officers training, benefits, equipment, transportation needs etc. The price collection for the index is based on unique contracts. However, the contracts do not fix the price of the service. Instead the charged rates that represent the services provided by selected contracts are collected. These charge-out rates are hourly rates. The index is compiled on a monthly basis.

In **Israel** the most common transaction in security services is one composed of the hourly rate. In the price collection the specific components of services are kept fixed. These components include the specific customer and customer field of activity, location, guards' professional level and type and the equipment of the guard. The index is compiled quarterly using a Laspeyres type of index formula.

The **UK** SPPI for security services is compiled using prices collected from four broad security categories: manned security; CCTV; secure transport; and other. Manned security is the largest component of the index with a weight of around 70%. This is split between: static uniform, mobile uniform, aviation security; and operation/response. The UK first published an SPPI for security services in 2000. The main methods of price collection are contract prices and discounted list prices.

Portugal, France, New Zealand, Mexico and **Australia** also calculate a price index for the investigation and security service industry. Contract prices are used in the collecting of data in France, New Zealand and Australia, whereas Mexico uses mark-up pricing.

Papers describing methods used in Japan, United States and Israel, were presented at the Voorburg Group meeting in Helsinki, 2005. See JPN, USA and ISR.

4.20 Industrial cleaning

1. Description of the sector

Cleaning services are a typical example of outsourcing. Consequently, the level of outsourcing of cleaning differs per country and thereby determines whether this industry is large. In some countries outsourcing is small and cleaning personnel are employed by the owner of the property that has to be cleaned. In this case the separate industry and market service provision is small.

Industry structure can further differ by country in typical sizes of cleaning firms, and the level of subcontracting.

Another aspect of different country situations is the kind of labour input: in some countries personnel is mostly hired by cleaning firms directly, while in other countries a large share of staff are hired from temporary work agencies.

In many countries the industry has seen increases in professionalism and organisation over the last decade(s). For instance, industry organisations have been founded. The products of the cleaning industry are transparent and simple compared to other business services. This has led to standards, norms and professional codes, including advanced quality assessment and control systems.

The transparency and competition in the market puts a continuous push for efficiency and productivity on the providers. Technical developments, including chemical, have influenced the industry. For example, a recent innovation is the use of micro fibres, in combination with very exactly dosed water and less cleaning agents.

The market is mostly competitive and free, with occasional exceptions. For instance, the Dutch Department for Education sets rates for cleaning of all public schools. This leads to a potential different price and different price change in this submarket.

For larger companies that need cleaning, cleaning brokers can help phrase demands and select a service provider for a long term contract. Long term contracts with occasional escalation (renegotiation) of the price are the main pricing mechanism.

The biggest share of costs is labour costs. Less important cost factors are materials, work clothes, equipment, and (less directly linked to specific outputs) costs for instruction of personnel, supervision, risk and profit.

The price determining factors are the objects to be cleaned (e.g. measured in square meters), the quality demanded, type of client, the moment of billing compared to delivery, and the length of the contract.

A large share of production concerns buildings, including many offices: large clients are banks and business service providers, hotels, restaurants and bars, education, and government.

Compilation of SPPI for industrial cleaning has not yet been on the agenda of the Voorburg Group meetings.

2. Classification aspects and scope of the survey

The United Nations' ISIC has one entry for cleaning:

7493 Building cleaning activities

The United Nations' CPC recognises the following product categories:

853 Cleaning services

8531 Disinfecting and exterminating services

8532 Window cleaning services

8533 General cleaning services

8534 Specialized cleaning services

The European Classification of Products by Activity (CPA) recognises 'Industrial cleaning services'. This name is used to distinguish it from services provided to households. Industrial cleaning services are a 3-digit category which is not split in the classification until the 6th digit:

74.7 Industrial cleaning services[74]

74.70.11 Disinfecting and exterminating services

[74] Concordant with the variety of the EU of the ISIC: the NACE.

This subcategory includes:

- services consisting in disinfecting dwellings and other buildings,
- exterminating insects, rodents and other pests,
- fumigation services and pest control services.

74.70.12 Window cleaning services

This subcategory includes services consisting in cleaning windows in dwellings and other buildings. Included here are cleaning services for exterior windows using swing stages.

74.70.13 Traditional cleaning services

This subcategory includes:

- services consisting in cleaning and maintaining dwellings and other commercial, administrative and industrial buildings,
- floor cleaning and waxing,
- interior wall cleaning,
- furniture polishing,
- other traditional cleaning services.

74.70.14 Specialized cleaning services

This subcategory includes:

- cleaning services for hospitals,
- cleaning services for computer rooms,
- specialised cleaning services of reservoirs and tanks, these being parts of either industrial sites or transport equipment,
- decontamination services,
- cleaning services of heat and air-ducts,
- sterilisation of objects or premises (operating rooms),
- cleaning of industrial machinery,
- bottle cleaning.

74.70.15 Furnace and chimney cleaning services

74.70.16 Other cleaning services

This subcategory includes:

- non-specialised cleaning services of:
  i. buses, underground and other trains, planes, ships and other transport equipment,
  ii. other cleaning services not elsewhere classified.

Australia and New Zealand use the Australian and New Zealand Standard Commodity Classification (ANZSCC) and the Australian and New Zealand Standard Industrial Classification (ANZSIC) for their SPPI. ANZSCC is based on the international CPC and ANZSIC is based on ISIC.

ANZSCC 874: Building Cleaning Services (including pest control)

ANZSIC 7866: Units mainly engaged in providing window, building, telephone cleaning or similar cleaning services (except carpet cleaning or shampooing services, steam cleaning, or sand blasting of building exteriors).

Exclusions/References

Units mainly engaged in:

- the cleaning of building exteriors (including steam cleaning, sand or other abrasive blasting),
- cleaning or shampooing carpets, drapes or curtains.

are excluded.

Primary activities include:

- Building cleaning service,
- Cleaning service nec,
- Office cleaning service,
- Chimney cleaning service,
- House cleaning service,
- Telephone cleaning service.

Usually, the scope of a PPI coincides well with all cleaning in any classification used.

Potentially some building cleaning is included in the CPI, for instance cleaning of communal areas of larger apartment buildings, and window and chimney cleaning. However traditional household cleaning which is included in most CPIs is not included in this service industry. Consequently cooperation with the CPI (in for instance joint surveying) is probably not feasible or only to a limited degree.

3. Sample design

On the one hand, relatively small sample sizes can suffice because the market is comparatively transparent and competitive. On the other hand, different submarkets exist with potentially different price development and in some countries the small companies have a large market share.

An explicit choice may have to be made whether to include subcontracting, if it is a large share of production.

A specific issue is that the specialisation of firms may make it necessary to sample by submarket to ensure the inclusion of respondents from all niches.

Depending on the structure of the industry within a country, PPS sampling or stratified sampling where in both cases turnover is preferred as the size variable can be used, ensuring that the largest companies are included in the sample with certainty.

4. Main pricing methods

The main pricing methods are contract pricing and model pricing. Contract pricing uses real transaction prices and is therefore the method of choice. Note, however, that due attention should be paid to the representativeness of the sample. Referring to discussion in section 2.4.2, the sample should represent adequately the population also in terms of timing and length of contract periods.

5. Costs and benefits of the alternative pricing methods

Occasionally, hourly rates are surveyed. Contract pricing with due consideration of both new long-term contracts, and new prices for older long term contracts, uses real transaction prices. It thereby approximates transaction pricing closer than the model pricing and hourly rates methods. Model pricing could be considered particularly in a situation where companies are unwilling to provide information about actual contracts. Use of the hourly charge-out rate method should be avoided if possible.

6. Quality issues

Contract pricing can be used effectively if items are clearly specified in terms of the transacted services themselves.

Quality change in the sense that specifications of the repeated service change, should be caught by close contact with respondents who have to inform about any such changes. If such changes occur, explicit quality adjustment methods are feasible in contact with respondents.

If a contract is discontinued, a substitution is needed. New items can enter the index in this case with simple methods like targeted mean imputation.

If hourly rates are surveyed, changes in efficiency (if any) are not captured in the index. This is a standard issue with hourly rates.

7. Collection of information and specification of the services

When prices in real long lasting contracts are followed, it is in theory enough to specify exactly which contract is followed, for instance with a client or contract number. However as soon as a question about the price, the service content or an item substitution arises, it is necessary for the price statistician to be well prepared and well informed of the respondents activities to enable effective discussion with the respondent. Therefore, besides a contract identifying, price determining aspects must also be recorded in the item description such as: objects to be cleaned, the quality demanded, type of client, the moment of billing compared to delivery, and the length of the contract.

8. Specific aspects

Exports are not very relevant for cleaning services. Potentially, large international firms have cleaning 'outlets' on a national level.

An interesting recent development is the emergence of companies that provide full service for building maintenance, including security, cleaning and simple other upkeep services.

Eurostat's Handbook on Price and Volume Measures in National Accounts is quite limited in its recommendation. It states that services are standard and a price index well feasible.

The products are more transparent than the more complex products of business services of professionals like engineers and lawyers. It is easier for clients to compare tenders leading to tougher competition. For example, a client can exactly compare on a yearly basis the tenders for having its offices cleaned. It is much harder to make an exact comparison between different accountants for the yearly auditing. There is therefore a higher pressure to increase productivity in these simpler industries; a cleaning firm will try to deliver a service in as few hours work as possible, whereas professionals may simply try to sell as many billable hours as possible.

9. Overview of national methods

Twelve countries have so far endeavoured into PPI compilation. Hereunder the experience of five countries is highlighted.

France

INSEE in France has an index running since 1999 with 1995 = 100. The index includes specialised cleaning in agriculture, unlike the usual classifications. The following submarkets are distinguished of which the PPI comprises items 2, 3, 4 and 6:

1. Industrial disinfection, rat control, insect control;
2. Windows;
3. Cleaning of buildings;
4. Specialised cleaning (agriculture, manufacturing industry);
5. Chimney sweeping;
6. Other cleaning (like transport vehicles).

The PPI is based on prices of representative contracts. The panel of firms is based on a stratified sample. The stratification is based on turnover. The panel comprises 130 companies, which render 917 prices periodically.

It was concluded from research that it is hard for companies to price a representative model contract; they prefer submitting the price of an existing contract. The moment of billing compared to delivery is also a price determining factor; prices have shown change because of the moment of payment. A specific price determining factor is the negotiation about new contracts with prospective clients in times of tough competition. Companies offer possibly down to 20% under the market price to acquire the contract. Once the client is in, the price rises stepwise towards the market price. This effect makes the SPPI compilation difficult.

It is hard for a cleaning company during the first year to estimate how much service the client will need.

Contracts are split into categories by type of client and by type of object. This distinction is made because the industry suspects that besides differences in price levels, price changes can differ:

Client

- Cleaning in public sector,
- Cleaning in private sector.

Object

- Offices:
    i. Public,
    ii. Private,
- Manufacturing:
    i. Manufacturing equipment,
    ii. Manufacturing, standard,
    iii. Manufacturing, sensitive areas,
- Commercial property,
- Public space,
- Communal areas in dwellings,
- Transport vehicles.

INSEE collects transaction prices of long running contracts. The contracts are distinguished according to the above specified objects. It turns out to be well possible for companies to distinguish between changes in prices and service.

The various types of cleaning contracts have different weights. Company weights are based on turnover figures that are acquired by a separate survey.

United Kingdom

In the United Kingdom the following family tree is used for cleaning:

- Commercial:
    i. Factories,

ii. Offices,

iii. Retail outlets,

iv. Other,

- Non-commercial:

i. Hospitals,

ii. Government,

iii. Other.

There is no main distinction between cleaning of buildings and other cleaning.

The pricing method is contract pricing. Prices pertain to: a reduced or not reduced fee for a transaction or a periodic payment for one quarter under a continuous contract. Respondents are asked to indicate whether the quality of the services, the type of client, the quantity, the speed, the conditions for payment or length of the contract have changed.

Finland

In Finland, a pilot survey runs since the third quarter of 2003. 20 to 30 contract prices per cleaning company are surveyed. Contracts vary in size according to the area to be cleaned and moment of cleaning; daytime, evenings or the weekend. Distinguished objects are: building, office, plant, fitness room, a bank and a shop.

The pricing method is an hourly rate method: the monthly fee is divided by the (planned) number of hours worked per month. If the contract changes, it is suspended from the index.

New Zeeland

New Zeeland uses the Australian and New Zealand Standard Industrial Classification (ANZSIC). The split is based on the following objects:

- Cleaning of buildings,
- Cleaning n.e.c.,
- Office cleaning,
- Chimney sweeping,
- Residential cleaning,
- Telephone cleaning.

Cleaning of buildings contains also pest control. Nine of 25 items in the survey refer to pest control. The variables distinguished in the 16 other items are:

1. Commercial espaces – non commercial espaces ;
2. Schools:
   - Window cleaning,
   - Offices,
   - Chimney sweeping,
   - Septic tank cleaning;
3. A regional component.

The pricing method is a combination of model prices, list prices and hourly rates. Building cleaning is surveyed with model prices. Cleaning of septic tanks uses list prices.

Objects are weighted in the index based on revenue. These data are derived from a yearly Business Survey.

The Netherlands

During pilot visits to firms, it turned out that there is a difference between firms specialised in cleaning buildings on the one hand and those specialised in cleaning transport equipment and other cleaning on the other hand. This last submarket consists of very heterogeneous services.

Cleaning firms specialised in cleaning buildings seemed to be able to provide data according to a number of different pricing methods. Also their preferences for pricing method differed. The following pricing methods were tried during the pilot survey (late 2004-early 2005):

- Model prices – contracts,
- Model prices – tenders,
- List prices,
- Standard hourly rates,
- Realised hourly rates,
- Contract pricing.

Unfortunately, no firms submitted trial data for contract pricing. The two model prices methods work well for most firms. Firms provide in addition to model prices an hourly rate related to the model, as well as a model related square meter fee.

List pricing is meant to be additional to one of the other methods. Almost all firms have price lists, but they are never representative for all production.

Standard hourly rates and realised hourly rates are considered less apt methods. One large firm is presently only providing these.

Cleaning firms specialised in cleaning transport equipment and other cleaning are very diverse. Three were visited during the pilot, of which two provide trial data. Both supplied model prices. The firms considered all other pricing methods impossible. These models are based on hourly rates for a combination of a vehicle with two cleaning experts. On top of this, hourly rates are calculated for clients of different sales' sizes. It is yet unclear whether such models are possible for other firms in this submarket.

Norway

Norway has made a feasibility study, which was finished in February 2005. From this study it was decided only to include traditional cleaning services (74.70.12) and window cleaning (74.70.13) in the output price index in the first place. The index survey does not distinguish between private and public sector. This decision is based on interviews with enterprises within the industry.

Price observation

- Window cleaning: the survey distinguishes between window cleaning inside and outside. Price per square meter is collected for both categories,
- Traditional cleaning services:
  i. Cleaning of interior walls and ceilings. Price per square meter is collected,
  ii. Waxing and scrubbing. Price per square meter is collected,
  iii. Daily cleaning services.

Prices of representative long running contracts are collected. In the survey the respondents are asked to give information about any changes in the following factors in the contract: Total number of square meters, number of square meters that require especially good cleaning (e.g. toilets) and the INSTA 8000 level on the service (Nordic quality standard). This information will be tried to be used for quality adjustment in the contract price.

The different services are weighted in the index based on revenue. This information is collected once a year.

Glossary

This Glossary uses the SNA 93 as the main reference.

"STS Manual" refers to "Methodology of short-term business statistics. Interpretation and guidelines", Eurostat, Edition 2002, ISBN 92-894-4762-1.

"PPI Manual" refers to the glossary of the Producer price index manual.

"OECD" refers to *the OECD Glossary of Statistical Terms*:

(http://stats.oecd.org/glossary/)

CODED is the Eurostat concepts and definitions database (http://forum.europa.eu.int/irc/dsis/coded/info/data/coded/en.htm)

Webster corresponds to the Merriam-Webster online dictionary (http://www.m-w.com).

Accrual accounting

Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished; this means that services are recorded in the system when they are provided.

Some services are special in the sense that they are characteristically supplied on a continuous basis. Examples are operating leasing, insurance and housing services (including those of owner-occupied dwellings). These services are recorded as provided continuously over the whole period the contract lasts or the dwelling is available. (SNA 93)

Base period

The base period generally is understood to be the period with which other periods are compared and whose values provide the weights for a price index. However, the concept of the "base period" is not a precise one and may be used to mean rather different things. Three types of base periods may be distinguished:

1. The *price reference period*, that is, the period whose prices appear in the denominators of the price relatives used to calculate the index, *or*
2. The *weight reference period*, that is, the period usually a year, whose values serve as weights for the index. However, when hybrid expenditure weights are used in which the quantities of one period are valued at the prices of some other period, there is no unique weight reference period, *or*
3. The *index* reference *period*, that is, the period for which the index is set equal to 100.

The three reference periods may coincide but frequently do not. (PPI Manual)

Basic price

The basic price reflects revenue received by the producer, for a unit of service produces as output, minus any taxes on services, and plus any subsidies received by the producer. The basic price includes any applicable discounts, rebates, surcharges, etc. that may apply to customers.

Chain indices

Chain indices are obtained by linking price (or volume) indices for consecutive periods; the short-term movements which are linked are calculated using weighting patterns appropriate to the periods concerned.

Charge-out rate

Charge-out rate is the average billing rate (e.g. hourly rate) designed to recover all costs of providing the service.

Component pricing

The price is made up of a number of sub-component prices that can be of any kind (transaction prices, unit values, list prices,...) except, at least predominantly, time-based prices (like hourly charge-out rates).

Computer software

Computer software is an asset consisting of computer programs, program descriptions and supporting materials for both systems and applications software; included are purchased

software and software developed on own account, if the expenditure is large. (Webster, OECD)

Contract pricing

Use of price of a repeated delivery of the same or very similar service over time by the same producer to the same client.

Domestic production

GDP (Gross Domestic Production) is intended to be a measure of the value created by the productive activity of resident institutional units. Although for the kinds of technical reasons just given, it may not be identical with the sum of the gross values added of resident producers it nevertheless consists mainly of the latter.

It should be noted, however, that GDP is not intended to measure the production taking place within the geographical boundary of the economic territory. Some of the production of a resident producer may take place abroad, while some of the production taking place within the geographical boundary of the economy may be carried out by non-resident producer units. For example, a resident producer may have teams of employees working abroad temporarily on the installation, repair or servicing of equipment. This output is an export of a resident producer and the productive activity does not contribute to the GDP of the country in which it takes places. Thus, the distinction between resident and non-resident institutional units is crucial to the definition and coverage of GDP. In practice, of course, most of the productive activity of resident producers takes place within the country in which they are resident. However, producers in service industries which typically have to deliver their outputs directly to their clients wherever they are located are increasingly tending to engage in production in more than one country, a practice which is encouraged by rapid transportation and instantaneous communication facilities. Geographical boundaries between adjacent countries are becoming less significant for mobile service producers, especially in small countries bordered by several other countries. (SNA, par. 6.238 and 6.239)

Elementary aggregate

An elementary aggregate is generally the lowest level within an index structure for which reliable weights exist for the population of interest.

Enterprise

The enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit. The enterprise thus defined is an economic entity which can therefore, under certain circumstances, correspond to a grouping of several legal units. (Council Regulation EEC 696/93 and STS Manual)

Establishment

An establishment is an enterprise or part of an enterprise that is situated in a single location and in which only a single (non-ancillary) productive activity is carried out or in which the principal productive activity accounts for most of the value added. (SNA 5.21, 6.80)

Exports

Exports of goods and services consist of transactions in goods and services (sales, barter, or gifts or grants) from residents to non-residents. The treatment of exports and imports in the SNA is generally identical with that in the balance of payments accounts as described in the Balance of Payments Manual. (OECD)

Family tree

A family tree in SPPI is a classification of services. In most cases, the classification comes from a specific survey in a particular services sector or from trade organisation.

Hedonic method

The hedonic method is a regression technique used to estimate the prices of qualities or models that are not available on the market in particular periods, but whose prices in those periods are needed in order to be able to construct price relatives; it is based on the hypothesis that the prices of different models on sale on the market at the same time are functions of certain measurable characteristics so regression methods can be used to estimate by how much the price varies in relation to each of the characteristics. (OECD)

Imports

Imports of goods and services consist of transactions in goods and services (purchases, barter, or receipts of gifts or grants) from non-residents to residents. The treatment of exports and imports in the System of National Accounts is generally identical with that in the balance of payments accounts as described in the Balance of Payments Manual. (OECD)

Industry SPPIs

An SPPI for an industry is compiled based on prices of outputs in establishments belonging to the industry concerned. It covers also prices of secondary production.

Institutional unit

An institutional unit is an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities. Enterprises are institutional units. Other kinds of units include households and governments. (PPI Manual)

Intra-enterprise transfer price

The value assigned on a per unit or per shipment basis to goods transferred from one establishment of an enterprise to another. It may or may not be economically significant. However, it is not a market price since ownership of the good does not change hands. (PPI Manual)

Kind-of-activity unit

A kind-of-activity unit is an enterprise, or a part of an enterprise, which engages in only one kind of (non-ancillary) productive activity or in which the principal productive activity accounts for most of the value added.

The kind-of-activity unit (KAU) groups all the parts of an enterprise contributing to the performance of an activity at class level (four digits) of NACE Rev. 1 and corresponds to one or more operational sub- divisions of the enterprise. The enterprise's information system must be capable of indicating or calculating for each KAU at least the value of production, intermediate consumption, manpower costs, the operating surplus and employment and gross fixed capital formation.

KAUs falling within a particular heading in the statistical classification of economic activities in the European Community (NACE REV 1) can produce products outside the homogeneous group, on account of secondary activities connected with them which cannot be separately identified from available accounting documents. The enterprise and the KAU are identical when it proves impossible for an enterprise to indicate or calculate information on all of the variables listed in this recital for one or more operational subdivisions. (Manual)

Laspeyres price index

A Laspeyres price index is a weighted arithmetic average of price relatives using the values of the earlier period as weights.

Local kind of activity unit (LKAU)

See "establishment".

Local unit

A local unit is an enterprise, or a part of an enterprise, which engages in productive activity at or from one location.

Margin (trade)

A trade margin is the difference between the actual or imputed price realised on a good purchased for resale (either wholesale or retail) and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.

Margin (transport)

A transport margin consists of those transport charges paid separately by the purchaser in taking delivery of the goods at the required time and place.

Market prices

Market prices for transactions are the amounts of money willing buyers pay to acquire something from willing sellers.

Mark-up

The mark-up is an amount added to the cost price to determine the selling price.

Model pricing

Estimation of price for a standardised product ("model") which is not transacted in the survey period.

Non-probability sampling

The selection of a sample of producers and products is non random but based on expert knowledge of judgment. Non-probability sampling is also known as "non-random sampling", "purposive sampling" and "judgmental sampling". (PPI Manual)

Non-resident

A unit is non-resident if its centre of economic interest is not in the economic territory of a country.

Output (services output)

Services output is produced by an establishment or local kind of activity units. The services output is provided for all uses, intermediate and final consumption, and for exports.

Output PPI

Output producers price indices seek to measure the change in the trading price of products sold by domestic producers on the domestic market and the non-domestic market. (Manual)

Percentage fee method

Price change (of commission fee) is calculated by multiplying the percentage change of commission fee by price change of underlying product (contract, asset or other product).

Period prices

Period prices are an estimate of the price across the period and so is an average price for the period. (PPI Manual)

Point-in-time prices

Point-in-time prices prevail on a particular day of the month. (PPI Manual)

PPI

PPI is a measure of the change in the prices of goods and services either as they leave their place of production or as they enter the production process. (PPI Manual)

PPS

Probability proportional to size is a sampling procedure whereby each unit in the universe has a probability of selection proportional to the size of some known relevant variable. In the case of establishments, size is usually defined in terms of employment or output. (PPI Manual)

Price

The price of a good or service is the value of one unit of that good or service.

Price index

The price index is a measure reflecting the average of the proportionate changes in the prices of the specified set of goods and services between two periods of time.

Price observation

The price collected or reported for a sampled product or item. (PPI Manual)

Price reference period

It is the period of which prices are compared with the prices of the current period. See also "base period".

Price relative

A price relative refers to a service product surveyed within the enterprise for which a micro index has been estimated. The micro index is made up of one of several price quotations for similar services.

Pricing mechanism

Corresponds to charging arrangements put in place by economic operators.

Pricing method

The use of a specific type of information on prices to represent the evolution of price in price index compilation. It is a procedure put in place by statisticians to make price data eligible to be entered in an index. The pricing method is largely determined by the characteristics of the data.

Principal activity

The principal activity of a producer unit is the activity whose value added exceeds that of any other activity carried out within the same unit (the output of the principal activity must consist of goods or services that are capable of being delivered to other units even though they may be used for own consumption or own capital formation).

The "principal activity" is identified by the "top-down" method as the activity which contributes most to the total value added of the entity under consideration. (Manual)

Probability sampling

The random selection of a sample of producers and/or products from a universe of activity in which each producer and/or product has a known non-zero probability of selection.

Producer's price

A producer's price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT, or similar deductible tax, invoiced to the purchaser; it excludes any transport charges invoiced separately by the producer.

Product SPPIs

An SPPI is compiled for product groups based on prices of outputs in all economy independently whether services are produced as principal or secondary production. The SPPI is typically published by industry classification.

Productivity

Productivity is understood as a change in working time in the provision of the same service product in two periods. Change in productivity may be a result of improved labour or capital productivity or of the switch in the use of labour and capital

Products

Products, also called "goods and services", are the result of production; they are exchanged and used for various purposes: as inputs in the production of other goods and services, as final consumption or for investment.

Product specification

The product/service specification is a detailed list of the characteristics that identify an individual sampled product. Its purpose is to ensure the consistency of the price collection through time. The specifications cover both the product/service and the transaction.

Quality adjustment

The process - or the result of the process - of estimating what the market price of a replacement product would be if it had the characteristics of the product it replaces and with whose price its price is to be compared. The adjustment is made so that the price comparison between the two products reflects "pure" price change only.

Reference period

See "price reference period".

Representative item

A representative item is a product/service selected for pricing within an elementary aggregate because of his significance in terms of turnover.

Resident

An institutional unit is resident in a country when it has a centre of economic interest in the economic territory of that country.

Revenue

The value of output sold. The value of invoiced sales of goods or services supplied to third parties during the reference period. The term is often used interchangeably with "sales" and "turnover". (PPI Manual)

Re-weighting

It is the introducing of a new set of weights into the index.

Sampling frame

The sampling frame is the list of the units (producers of services) in the universe from which a sample of units is to be selected. The sampling frame provides the details required to pick the sample, such as turnover, size, and main industry. The business register is the main sampling frame used in SPPIs completed sometimes by other sources as structural surveys or trade organisations information.

Secondary activity

A secondary activity is an activity carried out within a single producer unit in addition to the principal activity and whose output, like that of the principal activity, must be suitable for delivery outside the producer unit.

Service industry

The terms service industry(ies), service sector(s) or simply service(s) are generally used to refer to economic activities covered by Sections G to K and M to O of NACE Rev. 1, and the units that carry out those activities. (CODED)

Services

Services are outputs produced to order and which cannot be traded separately from their production; ownership rights cannot be established over services and by the time their production is completed they must have been provided to the consumers; however as an exception to this rule there is a group of industries, generally classified as service industries, some of whose outputs have characteristics of goods, i.e. those concerned with the provision, storage, communication and dissemination of information, advice and entertainment in the broadest sense of those terms; the products of these industries, where ownership rights can be established, may be classified either as goods or services depending on the medium by which these outputs are supplied. (SNA 6.8)

Sub-contractor

A person or firm being contracted by a main contractor or employer to carry out work or deliver services, labour or materials as part of a larger project.

Subsidy on product

A subsidy on a product is a subsidy payable per unit of a good or service produced, either as a specific amount of money per unit of quantity of a good or service or as a specified percentage of the price per unit; it may also be calculated as the difference between a specified target price and the market price actually paid by a buyer.

Standard (pricing)

The price is an actually paid price for an individual service or service package that is repeated in successive survey periods.

Tax on product

A tax on a product is a tax that is payable per unit of some good or service, either as a specified amount of money per unit of quantity or as a specified percentage of the price per unit or value of the good or service transacted.

Time-based method

The price is directly or predominantly based on prices for a set amount of time's work (e.g. one hour's work) charged by the service provider.

Transaction

A transaction is an economic flow that is an interaction between institutional units by mutual agreement or an action within an institutional unit that it is analytically useful to treat like a transaction, often because the unit is operating in two different capacities.

Transfer price

A price adopted for bookkeeping purposes used to value transactions between affiliated enterprises integrated under the same management at artificially high or low levels in order to effect an unspecified income payment or capital transfer between those enterprises. (PPI Manual). In the case of trade between a unit and another unit abroad of the same enterprise group, the invoiced price may well be a transfer or disposal price whose evolution may not always reflect the price changes for a client not within the same enterprise group (Manual)

UMTS

UMTS stands for Universal Mobile Telecommunications Systems. UMTS represents systems with large capacity, data speeds and new service capabilities for mobile network.

Unit price

The price of the product is expressed per some quantity unit of that product.

Unit value method

A pricing method based on unit value prices.

Unit value price

The price is calculated by dividing revenues from sales of services by quantity of delivered services.

Value added – gross

Gross value added is the value of output less the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry or sector; gross value added is the source from which the primary incomes of the SNA are generated and is therefore carried forward into the primary distribution of income account.

Value added at factor costs

Value added at factor cost[75] can be calculated from turnover (excluding VAT and other similar deductible taxes directly linked to turnover), plus capitalised production, plus other operating income plus or minus the changes in stocks, minus the purchases of goods and services, minus other taxes on products which are linked to turnover but not deductible, minus the duties and taxes linked to production.

Value added – net

Net value added is the value of output less the values of both intermediate consumption and consumption of fixed capital.

Value added tax (VAT)

A value added tax (VAT) is a tax on products collected in stages by enterprises; it is a wide-ranging tax usually designed to cover most or all goods and services but producers are obliged to pay to government only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation, while VAT is not usually charged on sales to non-residents (i.e. exports).

Weights

Weights are a set of numbers used to weight price relatives, or elementary price indices, when these are averaged to obtain price indices or higher-level indices.

[75] National accounts have introduced the concept of 'value added at basic prices' In comparison to value added at factor costs, it includes taxes linked to production, but operating subsidies on production are excluded The alignment with the national accounts may introduce some advantages, so the EU Member States may use the concept of value added at basic prices as a proxy for value added at factor costs

Abbreviations

ANZSIC	Australian and New Zealand Standard Industrial Classification
CPA	Classification of Products by Activity (Eurostat)
CPC	Central Product Classification
CPI	Consumer price index
ESA	European system of accounts
EU	European Union
Eurostat	Statistical Office of the European Communities
GDP	Gross domestic product
INSEE	Institut National de la Statistique et des Etudes
ISIC	International Standard Industrial Classification of all Economic Activities
KAU	Kind of activity unit
LKAU	Local kind of activity unit
NA	National accounts
NACE	General Industrial Classification of Economic Activities within the European Communities
NAICS	North American Industrial Classification System
NAPCS	North American Product Classification System
NPI	Non-profit institution
NSI	National Statistical Institute
OECD	Organisation for Economic Co-operation and Development
PPS	Probability proportional to size
SPPI	Producer price index
SNA	System of National Accounts
SPPI	Services producer price index
STS-R	Short-term Statistics regulation (for EU Member states)
UMTS	Universal Mobile Telecommunications Systems
UN	United Nations
VAT	Value-added tax

Bibliography

An important source of information is the websites of the Voorburg Group), which contain descriptions on countries' experiences in the compilation of SPPIs for various services. The address of the website is http://stds.statcan.ca/english/voorburg/index.htm. The list of bibliography below covers only documents that cannot be found on these websites.

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OECD PUBLICATIONS, 2, rue André-Pascal, 75775 PARIS CEDEX 16
PRINTED IN FRANCE
(30 2006 17 1 P) ISBN 978-92-64-03003-9 – No. 55526 2007

STATISTICS

Methodological Guide for Developing Producer Price Indices for Services

The *International Producer Price Index Manual* (PPI Manual) published by the IMF in 2004, constituted a landmark for international standards on price measurement and contains detailed, comprehensive information for the compilation of producer price indices as well as an extensive coverage of the conceptual and theoretical issues. This *Methodological Guide for Developing Producer Price Indices for Services* is a complement to the PPI Manual in two ways: it focuses on service-specific aspects in the PPI compilation by developing further the conceptual framework and it adds detailed descriptions of PPI measurement for a series of service industries.

This *Guide* has been jointly produced by the OECD, Eurostat and the members of a Taskforce with delegates from 19 OECD/EU member countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Japan, Korea, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. Several countries contributed to the guide by providing descriptions of service PPIs for individual industries, other countries were represented by national experts in at least one meeting of the Task Force.

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ISBN 978-92-64-03003-9
30 2006 17 1 P

9 789264 030039